

Ninth Edition

PMP[®] EXAM

Practice Test and Study Guide

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AN AUERBACH BOOK

J. LeRoy Ward, PMP, PgMP
Ginger Levin, PMP, PgMP

PMP[®] EXAM

Practice Test and Study Guide

Ninth Edition

ESI International Project Management Series

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Preface

ESI International has been helping people to prepare for the project management professional (PMP®)* certification exam since early 1991. Since then, it has become quite clear that most prospective exam takers (ourselves included when we studied for the exam many years ago) ask two questions when they decide to earn PMP® certification

“What topics are covered on the exam?” and “What are the questions like?” Not surprisingly, some of the most sought-after study aids are practice tests, which are helpful in two ways: first, taking practice tests increases your knowledge of the kinds of questions, phrases, terminology, and sentence construction that you will encounter on the “real” exam; and second, taking practice tests provides an opportunity for highly concentrated study by exposing you to a breadth of project management content generally not found in a single reference source.

We initiated the development of this specialty publication with only one simple goal in mind: to help you study for, and pass, the PMP® certification exam. Because the Project Management Institute (PMI®)† does not sell “past” exams to prospective certification candidates for study purposes, the best anyone can do is to develop practice test questions that

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are as representative of the real questions as possible. And that is exactly what we have done.

As we developed this publication, we have worked hard to make the questions difficult ones yet representative of what you may encounter on the actual exam. Having attained the PMP®, we know it is a difficult exam and one that requires study and dedicated effort.

The result of our effort is the *PMP® Exam: Practice Test and Study Guide*. This ninth edition—like the preceding eight—contains study hints, a list of exam topics, and 40 multiple-choice questions for each of the ten knowledge areas presented in *A Guide to the Project Management Body of Knowledge* Fifth Edition (2013), better known as the *PMBOK® Guide*,* for a grand total of 400 questions.

And as in previous editions, this edition includes a plainly written rationale for each correct answer, along with a supporting reference list. Our reference list alone took many weeks to compile. If you had nothing but the list of exam topics and the references, you would be well on your way to passing the exam.

You will find a reference to one or more of the five process groups, Initiating, Planning, Executing, Monitoring and Controlling, or Closing at the end of each rationale. Those references are important because they give you an understanding of the types of exam questions that fall within each of these five major project management performance domains.

This ninth edition includes many scenario-based questions, which comprise approximately 50 percent of the questions found on the PMP® exam. It omits many of the purely definitional questions; PMI® has gradually eliminated these types of questions from the exam.

We have included questions specifically related to the *PMBOK® Guide*'s ten knowledge areas and the various

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inputs, tools and techniques, and outputs described in the processes and subprocesses of those areas. Additionally, we have reduced the length of many of our questions, to more accurately represent the real exam. Finally, in response to a number of requests we have included a completely original, 200-question practice test; none of these questions are found in the other sections of this book. **The online practice test is available at <http://www.ittoday.info/pmp/examhome.html>.**

We have retained the helpful Study Matrix in this edition as well. The matrix is included as an appendix. The matrix, which is based on PMI®'s *PMP Examination Content Outline* (July 2011), will help you to use the 200-question exam to its full advantage. The matrix provides a way for you to assess your strengths and weaknesses in each performance domain and to identify areas that require further study.

A special note to those who speak English as a second language (ESL): Our experience in teaching project management programs around the world has shown that most of our ESL clients understand English well enough to pass the PMP® exam *as long as they know the content*. Nevertheless, in an effort to avoid adding to your frustration before taking the exam, we have painstakingly reviewed each question and answer in the practice test to ensure that we did not use words, terms, or phrases that could be confusing to those who are not fluent in English.

Although the language issue may concern you, and rightfully so, the only difference between you and those who speak English as their first language is the amount of time it takes to complete the exam. We know of only one person who did not have enough time, and that individual was able to complete all but two questions. We would suggest, therefore, that if you can grasp the content expressed in this publication, a few colloquialisms or ambiguous terms on the real exam will not ultimately determine whether you pass or fail: Your subject matter knowledge will do that!

Earning the PMP® certification is a prestigious accomplishment. But studying for it need not be difficult if you use the tools available. You may want to include our companion piece, *PMP® Exam Challenge!* in your study plan if you have not already done so. In an easy flash-card format, it too provides many opportunities to become thoroughly familiar and comfortable with the project management body of knowledge.

Good luck on the exam!

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New York, NY

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Online Practice Test

An online test is available for download at <http://www.ittoday.info/pmp/examhome.html>

To download the test, use the six-character code above the barcode on the book's back cover.

About the Authors

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Professional, is a consultant and educator in portfolio, program, and project management. She has conducted numerous maturity assessments in portfolio, program, and project management; business development; knowledge management; and software over the past 20 years. She has 47 years of experience working in the private sector, the U.S. Federal Government, and in consulting and training. She is an Adjunct Professor at the master's degree level in project management for the University of Wisconsin-Platteville and at the doctoral level for SKEMA University in Lille, France and RMIT in Melbourne, Australia. She holds a doctorate in public administration from The George Washington University, where she also received the outstanding dissertation award. Dr. Levin is the editor, author, or co-author of 14 books; is an active member of the Project Management Institute; and is a popular speaker who has presented at numerous PMI events since 1997.

J. LeRoy Ward, PMP, PgMP, and CSM is the Executive Vice President of ESI International, where he is the principal executive responsible for R&D, Product Strategy, Consulting, and Corporate Marketing. ESI International is the world's largest project-focused training company with curriculums addressing project and program management, business analysis, contract management, sourcing management, and business skills.

A PMP® since 1990, Mr. Ward developed ESI's popular *PMP Exam Preparation* course and taught it and other courses to people from more than 50 countries. Along with Carl Pritchard, he publishes *The Portable PMP® Prep; Conversations on Passing the PMP®*, another useful reference aid, along with his *Dictionary of Project Management Terms*, now in its Third Edition. He has almost 40 years of experience in the public and private sectors and is a popular and dynamic speaker in the field. He holds B.S. and M.S. degrees from Southern Connecticut University and an M.S.T.M. degree with distinction from The American University.

Dr. Levin and Mr. Ward have been helping people prepare for the PMP® since 1996, when the first edition of this Practice Test and Study Guide and the *PMP Challenge!* were published. By attending and presenting at PMI Congresses and to PMI Chapters around the world and reading as much as possible in the field, they keep up with the best practices to follow. While they each have other publications on their own, they have collaborated on a comparable Practice Test and Study Guide for the Program Management Professional (PgMP®) exam, and a *PgMP® Challenge*. They authored *Program Management Complexity: A Competency Model*, published in 2011, and led the development of ESI's Maturity Models: *PortfolioFramework™*, *Program Framework™* and *ProjectFramework™*. Further, they are series editors for CRC in books on project and program management.

Acronyms

AC	actual cost
AD	activity duration
BAC	budget at completion
CAPM®	Certified Associate in Project Management
CEO	chief executive officer
CPI	cost performance index
CPM	critical path method
CSM	Certified Scrum Master
CV	cost variance
EAC	estimate at completion
EMV	expected monetary value
ERP	enterprise resource planning
ESL	English as a second language
ETC	estimate to complete
EV	earned value
EVA	economic value added
EVM	earned value management
ID	identification
IFB	invitation for bid
ISO	International Organization for Standardization

IT	information technology
LCC	life-cycle cost
MRP	material requirements planning
OBS	organizational breakdown structure
OPM ³	Organizational Project Management Maturity Model
PDM	precedence diagramming method
PERT	program evaluation and review technique
PgMP®	Program Management Professional
<i>PMBOK® Guide</i>	<i>A Guide to the Project Management Body of Knowledge</i>
PMI®	Project Management Institute
PMIS	project management information system
PMM	Project Management Methodology
PMO	program management office
PMP®	Project Management Professional
PV	planned value
RACI	responsible, accountable, consult, inform
RAM	responsibility assignment matrix
RBS	resource breakdown structure
RBS	risk breakdown structure
R&D	research and development
RF	radio frequency
QA	quality assurance
RFP	request for proposal
ROI	return on investment
SD	standard deviation
SPC	statistical process control
SPI	schedule performance index

SV	schedule variance
SWOT	strengths-weaknesses-opportunities-threats
TCPI	to-complete performance index
VAC	variance at completion
WBS	work breakdown structure

Introduction

The PMP® exam contains 200 questions, of which 25 questions will not be included in the pass/fail determination. These “pretest” items, as PMI® calls them, will be randomly placed throughout the exam to gather statistical information on their performance to determine their use for future exams. The questions on the exam are distributed as follows by process group following the *PMI PMP Examination Content Outline—July 2011*

- 13% relate to Initiating the Project
- 24% relate to Planning the Project
- 30% relate to Executing the Project
- 25% relate to Monitoring and Controlling the Project
- 8% relate to Closing the Project

For the practice test in this book, we provide all 200 questions as if they were real questions, and the percentages above are applied to the 200 questions. There are no pretest questions in our practice exam.

There also are not a certain number of the scored 175 questions that you must answer correctly. PMI® explains in its *PMP Credential Handbook*—revised 12 September 2012, it generates a pass/fail score based on proficiency levels in the answers in each of the five process groups. This approach means that you will learn whether you were Proficient, Moderately Proficient or Below Proficient in each process group.

PMI® defines on page 30 of the Handbook these terms as follows:

- Proficient—performance is above average in the process group
- Moderately Proficient—performance is at the average level in the process group
- Below Proficient—performance is below average in the process group

These scores are established based on a psychometric analysis as PMI® uses subject matter experts throughout the world to establish a point in which it feels a candidate for the exam should be able to pass a question and establishes a level of difficulty for each question. We do not know the algorithm PMI® uses to establish the proficiency levels. Our practice exam, therefore, scores each question equally, which means you will learn the number of questions you answer correctly in each of the five process groups. Obviously, your goal is to be Proficient, and our goal is that this book can assist you in your quest to attain the Proficient level.

To use the study guide effectively, work on one section at a time. It does not matter which one you choose first. Start by reading the study hints. They provide useful background on the content of the PMP® exam and identify the emphasis placed on various topics. Familiarize yourself with the major topics listed. Then answer the 40 practice questions, recording your answers on the sheet provided. Finally, compare your answers with those in the answer key. The rationales provided should clarify any misconceptions you may have had, and the process group designations will give you an understanding of the types of questions you might see on the exam that relate to those process groups. For further study and clarification, you may want to consult the bibliographic reference.

After you have finished answering the questions that follow each section, it is time to take the completely rewritten and original, 200-question practice test. We recommend you take the online version first. Then, once you receive your scores, you can do some additional studying as needed and refer to the exam in the book. Note your answers on the sheet provided, compare your answers to the answer key, and use the Study Matrix in the Appendix to determine what areas you need to study further.

To make the most of this book, use it regularly. Take and retake the practice test on line or in the book. Photocopy the answer sheet in order to have a clean one each time you retake the test. Our suggestion is to score at least 80% of the questions in our practice test correctly before you take the PMP® exam.

You may want to convene a study group to compare your answers with those of your colleagues. This method of study is a powerful one. You will learn more from your colleagues than you ever thought possible! Make sure you have a solid understanding of the exam topics that are provided in each section. Consult our extensive bibliography, or other sources you have found useful, for further independent study. And, most important, create a study plan and stick to it. Your chances of success are raised dramatically when you dedicate yourself to your goal.

Project Integration Management

Study Hints

The Project Integration Management questions on the PMP® certification exam address critical project management functions that ensure coordination of the various elements of the project. As the *PMBOK® Guide* explains the processes focus on integration activities designed to ensure project success; therefore, integration characteristics involve unification, consolidation, communication, and integrative activities. Project Integration Management involves making decisions about resource use, trade-offs among competing objectives and alternatives, and managing the interdependencies between the ten knowledge areas. It addresses project initiation with the development of a project charter, project plan development, direct and manage the project work, monitoring and controlling the project work, integrated change control, and closing the project. These six processes not only interact with one another but also interact with processes in the other nine knowledge areas. It is important to note PMI®'s view that integration occurs in other areas as well. For example, project scope and product scope need to be integrated, project work

needs to be integrated with other ongoing work of the organization, and deliverables from various technical specialties need integration.

The Project Integration Management questions are relatively straightforward. Most people find them to be fairly easy. But because they cover so much material, including all five process groups, you do need to study them carefully to become familiar with PMI®'s terminology and perspectives. *PMBOK® Guide* Figure 4-1 provides an overview of the structure of Project Integration Management. Know this chart thoroughly.

Following is a list of the major Project Integration Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Project, program, and portfolio definitions

Project management definition

Project life cycle

Project management office

Project process groups

- Initiating
- Planning
- Executing
- Monitoring and Controlling
- Closing

Business case

Project statement of work

Develop project charter

Enterprise environmental factors

Organizational process assets

Project management information system (PMIS)

Facilitation techniques

Analytical techniques

Expert judgment

Project management plan

Direct and manage project work

Key management reviews

Corrective and preventive action

Deliverables

Work performance information

Meetings

Project baselines

Subsidiary plans

Standards and regulations

Monitor and control project work

Validated changes

Forecasts

Integrated change control

Change requests

Change control meetings

Change control procedures

Change management plan

Configuration management plan

Change log

Approved change requests

Close project or phase

Administrative closure procedure

Accepted deliverables

Product, service, or result transition

Lessons learned

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. You work for a software development company that has followed the waterfall development model for more than 20 years. Lately, a number of customers have complained that your company is taking too long to complete its projects. You attended a class on agile development methods and believe that if the company used the agile approach, it could provide products to clients in a shorter time period. However, it would be a major culture change to switch from the waterfall methodology to the agile approach and to train staff members in this new approach. You mentioned this idea to the director of the PMO, and although she liked the idea, she would need approval from the company's portfolio review board to move forward with it. She suggested that you document this idea in a—
 - a. Business need
 - b. Product scope description
 - c. Project charter
 - d. Business case

2. You are managing a large project with 20 key internal stakeholders, eight contractors, and six team leaders. You must devote attention to effective integrated change control. This means you are concerned primarily with—
 - a. Reviewing, approving, and controlling changes
 - b. Maintaining baseline integrity, integrating product and project scope, and coordinating change across knowledge areas
 - c. Integrating deliverables from different functional specialties on the project
 - d. Establishing a change control board that oversees the overall project changes

3. You plan to hold a series of meeting as you execute the project plan. While different attendees will attend each meeting, a best practice to follow is to:
 - a. Group stakeholders into categories to determine which ones should attend each meeting
 - b. Not mix the types of meetings on your project
 - c. Be sensitive to the fact that stakeholders often have very different objectives and invite them to determine the meeting's agenda
 - d. Recognize that roles and responsibilities may overlap so focus on holding meetings primarily for decision making

4. You are the project manager in charge of developing a new shipping container for Globus Ocean Transport, which needs to withstand winds of 90 knots and swells of 30 meters. In determining the dimension of the container and the materials to be used in its fabrication, you convene a group of knowledgeable professionals to gather initial requirements, which will be included in the—
 - a. Project charter
 - b. Bill of materials
 - c. WBS
 - d. Project Statement of Work
5. You have assembled a core team to develop the project management plan for the next generation of fatigue fighting drugs. The science is complex, and the extended team of researchers, clinicians, and patients for trials exceeds 500 people. The content of your project management plan will be directed primarily by two factors. They are—
 - a. Project complexity and the capability of resources
 - b. Number of resources and project schedule
 - c. Team member experience and budget
 - d. Application area and complexity
6. When you established the change control board for your avionics project, you established specific procedures to govern its operation. The procedures require all approved changes to baselines to be reflected in the—
 - a. Performance measurement baseline
 - b. Change management plan
 - c. Quality assurance plan
 - d. Project management plan

7. You are beginning a new project staffed with a virtual team located across five countries. To help avoid conflict in work priorities among your team members and their functional managers, you ask the project sponsor to prepare a—
- a. Memo to team members informing them that they work for you now
 - b. Project charter
 - c. Memo to the functional managers informing them that you have authority to direct their employees
 - d. Human resource management plan
8. The purpose of economic value added (EVA) is to—
- a. Determine the opportunity costs associated with the project
 - b. Determine a non–time-dependent measure of profit or return
 - c. Assess the net operating profit after taxes
 - d. Evaluate the return on capital percent versus the cost of capital percent
9. Facilitation techniques are used throughout project management. Your company is embarking on a project to completely eliminate defects in its products. You are the project manager for this project, and you are developing your project charter. To assist you, which of the following facilitation techniques did you use?
- a. Surveys
 - b. Delphi approach
 - c. Meeting management
 - d. Focus groups

10. The direct and manage project work process truly is important in project management. It affects many other key processes and uses inputs from others. Working with your team at its kickoff meeting, you explain the key benefit of this process is to—
 - a. Implement approved changes
 - b. Provide overall management of the project work
 - c. Lead and perform activities in the project management plan
 - d. Perform activities to accomplish project objectives
11. You are managing a project in an organization is characterized by with rigid rules and policies and strict supervisory controls. Your project, sponsored by your CEO who is new to the company, is to make the organization less bureaucratic and more participative. You are developing your project management plan. Given the organization as it now is set up, as you prepare your plan, you can use which of the following organizational process assets—
 - a. Guidelines and criteria
 - b. Project management body of knowledge for your industry
 - c. Organizational structure and culture
 - d. The existing infrastructure

12. You are fairly new to managing a project but have been a team member for many years. You are pleased you were selected to manage your company's 2015 model line of hybrid vehicles. You are now planning your project and have been preparing the subsidiary plans as well. You realize some project documents also are required to help manage your project. An example of one that you believe will be especial helpful is the—
- a. Business case
 - b. Key performance indicators
 - c. Project management information system
 - d. Project statement of work
13. You work for a telecommunications company, and when developing a project management plan for a new project, you found that you must tailor some company processes because the product is so different than those products typically produced by your company. To tailor these processes, you will follow—
- a. Standardized guidelines and work instructions
 - b. Stakeholder risk tolerances
 - c. Expert judgment
 - d. Structure of your company
14. You are implementing a project management methodology for your company that requires you to establish a change control board. Which one of the following statements best describes a change control board?
- a. Recommended for use on all (large and small) projects
 - b. Used to review, evaluate, approve, delay, or reject changes to the project
 - c. Managed by the project manager, who also serves as its secretary
 - d. Composed of key project team members

15. An automated tool, project records, performance indicators, data bases, and financials are examples of items in—
 - a. Organizational process assets
 - b. Project management information systems
 - c. Project management planning approaches
 - d. The tools and techniques for project plan development

16. You realize that projects represent change, and on your projects, you always seem to have a number of change requests to consider. In your current project to manage the safety of the nation's cheese products and the testing methods used, you decided to prepare a formal change management plan. An often overlooked type of change request is—
 - a. Adding new subject matter experts to your team
 - b. Updates
 - c. Work performance information
 - d. Enhancing the reviews performed by your project's governance board

17. You have been directed to establish a change control system for your company, but must convince your colleagues to use it. To be effective, the change control system must include—
 - a. Procedures that define how project documents may be changed
 - b. Specific change requests expected on the project and plans to respond to each one
 - c. Performance reports that forecast project changes
 - d. A description of the functional and physical characteristics of an item or system

18. You are working on the next generation of software for mobile phones for your telecommunications company. While time to market is critical, you know from your work on other projects that management reviews can be helpful and plan to use them on your project. You are documenting them as part of your—
- a. Governance plan
 - b. Change management plan
 - c. Performance reviews
 - d. Project management plan
19. Your cost control specialist has developed a budget plan for your project to add a second surgical center to the Children's Hospital. As you analyze cash flow requirements, you notice that cash flow activity is greatest in the closing phase. You find this unusual because on most projects the largest portion of the budget spent during—
- a. Initiating
 - b. Monitoring and Controlling
 - c. Controlling
 - d. Executing
20. You are project manager for a systems integration effort and need to procure the hardware components from external sources. Your subcontracts administrator has told you to prepare a product description, which is referenced in a—
- a. Project statement of work
 - b. Contract scope statement
 - c. Request for proposal
 - d. Contract

21. Because your project is slated to last five years, you believe rolling wave planning is appropriate. It provides information about the work to be done—
- a. Throughout all project phases
 - b. For successful completion of the current project phase
 - c. For successful completion of the current and subsequent project phases
 - d. In the next project phase
22. You want to minimize the impact of changes on your project, yet you want to ensure that change is managed when and if it occurs. This can be done through each of the following ways EXCEPT—
- a. Rejecting requested changes
 - b. Approving changes and incorporating them into a revised baseline
 - c. Documenting the complete impact of requested changes
 - d. Ensuring that project scope changes are reflected in changes to product scope
23. You are managing a project to introduce a new product to the marketplace that is expected to have a very long life. In this situation, the concept of being *temporary*, which is part of the definition of a project,—
- a. Does not apply because the project will have a lasting result
 - b. Does not apply to the product to be created
 - c. Recognizes that the project team will outlive the actual project
 - d. Does not apply because the project will not be short in duration

24. When closing a project, it is a best practice to—
- a. Update the project documents
 - b. Prepare a sustainment plan for the project's benefits
 - c. Measure product scope against the project management plan
 - d. Review the scope baseline
25. All the following are project baselines that are generally part of the project management plan EXCEPT—
- a. Technical
 - b. Scope
 - c. Time
 - d. Cost
26. You are responsible for a project management training curriculum that is offered throughout the organization. In this situation, your intangible deliverables are—
- a. Employees who can apply the training effectively
 - b. Training materials for each course
 - c. Certificates of completion for everyone who completes the program
 - d. The training curriculum as advertised in your catalog

27. Working on your project management training curricula project, you decided it would be beneficial to you to become an active member of the Project Management Institute as part of the objectives of your project is to ensure it is aligned with PMI®'s best practices. To complement PMI®'s *Work Breakdown Structure Practice Standard*, you learned PMI® was requesting volunteers to participate in development of a similar standard on the Scope Statement. You volunteered, and now the Standard is issued. This is an example of:
- a. Improving your own competency as a project manager
 - b. Corrective action
 - c. Preventive action
 - d. A requirement for you to immediately update your project management plan
28. Ideally, a project manager should be selected and assigned at which point in the project life cycle?
- a. During the initiating processes
 - b. During the project planning process
 - c. At the end of the concept phase of the project life cycle
 - d. Prior to the beginning of the development phase of the project life cycle
29. Closing a project phase should not be delayed until project completion because—
- a. Useful information may be lost
 - b. The project manager may be reassigned
 - c. Project team members may be reassigned by that time
 - d. Sellers are anxious for payments

30. As you are working on your telecommunications project, even though you are using agile methods, you realize you are preparing an extensive amount of data and information. You regularly share data with your project team. Your last team meeting focused on the number of change requests and also the start and finish dates of activities in your schedule. They are examples of—
- a. Key performance indicators
 - b. Work performance reports
 - c. Work performance data
 - d. Work performance information
31. Project management processes describe project work, while product-oriented management processes specify the project's product. Therefore, a project management process and a product-oriented management process—
- a. Overlap and interact throughout the project
 - b. Are defined by the project life cycle
 - c. Are concerned with describing and organizing project work
 - d. Are similar for each application area
32. The close project or phase process addresses actions and activities concerning all of the following EXCEPT—
- a. Completion or exit criteria for the project or phase have been met
 - b. Stakeholder approval that the project has meet their requirements
 - c. Review of the project and/or phase information for potential future use
 - d. Documentation that completed deliverables have been accepted

33. You are a personnel management specialist recently assigned to a project team working on a team-based reward and recognition system. The other team members also work in the human resources department. The project charter should be issued by—
- The project manager
 - The client
 - A sponsor
 - A member of the PMO who has jurisdiction over human resources
34. Your project is proceeding according to schedule. You have just learned that a new regulatory requirement will cause a change in one of the project's performance specifications. To ensure that this change is incorporated into the project management plan, you should—
- Call a meeting of the change control board
 - Change the WBS, project schedule, and project plan to reflect the new requirement
 - Prepare a change request
 - Immediately inform all affected stakeholders of the new approach to take on the project
35. Different types of project phases are used on projects, and each phase culminates in the completion of at least one deliverable. The high-level nature of these phases means they are an element of the project life cycle. Some phases start before others complete. If this approach is followed, it may result in—
- An increase in the number of issues
 - Increasing the schedule
 - The need for a CCB
 - More rework

36. Assume your company is a leader in the market in production of cereal products. It has been in this market for over 50 years. You are the project manager for a new product that is a derivative from the company's core product. As you determine a life cycle for this project, you believe you should follow one that is—
 - a. Incremental
 - b. Predictive
 - c. Iterative
 - d. Adaptive
37. Oftentimes when a project is terminated, senior managers will replace the project manager with an individual who is skilled in closing out projects. If this is done, the first step for the termination manager should be to—
 - a. Notify all relevant stakeholders of the termination
 - b. Complete the lessons learned report
 - c. Conduct an immediate review of the work packages
 - d. Review the status of all contracts
38. On your project you want to avoid bureaucracy, so you adopt an informal approach to change control. The main problem with this approach is—
 - a. There is no “paper trail” of change activity
 - b. Regular disagreements between the project manager and the functional manager will occur
 - c. There are misunderstandings regarding what was agreed upon by stakeholders
 - d. There is a lack of sound cost estimating to assess the change's impact

39. Projects are supposed to succeed, not fail. However, termination is an option to consider when all but which one of the following conditions exist?
- a. The customer's strategy has changed.
 - b. There are new stakeholders.
 - c. Competition may make the project results obsolete.
 - d. The original purposes for the project have changed.
40. All projects involve some extent of change, because they involve work that is unique in some fashion. Therefore, it is important that a project management plan includes a—
- a. Description of the change request process
 - b. Configuration management plan
 - c. Methodology for preventive action to avoid the need for excessive changes
 - d. A work authorization system

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
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16.	a	b	c	d
17.	a	b	c	d
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32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. d. Business case

The business case is used to provide the necessary information to determine whether or not a project is worth its investment. It is used to justify the project and typically contains a cost-benefit analysis and a business need. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 69

2. a. Reviewing, approving, and controlling changes

Performing integrated change control consists of coordinating and managing changes across the project. Activities that occur within the context of perform integrated change control include: validate scope, control scope, control schedule, control costs, perform quality assurance, control quality, manage the project team, control communications, control risks, conduct procurements, control procurements, manage stakeholder engagement, and control stakeholder engagement. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 94–95

3. b. Not mix the types of meetings on your project

Meetings are a tool and technique used in direct and manage project work. Meetings tend to be one of three types: information exchange; brainstorming, option evaluation, or design; or decision making. A best practice is to not combine the types of meetings and prepare for them with a well-defined agenda, purpose, objective, and time frame. They should be documented using minutes and action items. [Executing]

PMI®, *PMBOK® Guide*, 2013, 84

4. a. Project charter

The project charter documents the business needs, assumptions, constraints, understanding of the customer needs and high-level requirements and what the new product, service, or result is to satisfy. It is the document used to formally authorize the project. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 71

5. d. Application area and complexity

The content of the project management plan is primarily influenced by the application area [in this case drug development] and complexity of the project. The size of the plan is typically commensurate with the size and complexity of the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 74

6. d. Project management plan

The project management plan must be updated changes to subsidiary plans and baselines subject to formal change control processes. Those changes must be communicated to appropriate stakeholders in a timely manner. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 100

7. b. Project charter

Although the project charter cannot stop conflicts from arising, it can provide a framework to help resolve them, because it describes the project manager's authority to apply organizational resources to project activities. [Initiating]

Meredith and Mantel 2012, 228; PMI®, *PMBOK® Guide*, 2013, 71–72

8. d. Evaluate the return on capital percent versus the cost of capital percent

EVA quantifies the value a company provides to its investors and seeks to determine if a company is creating or destroying value to its shareholders. It is calculated by subtracting the expected return, (represented by the capital charge), from the actual return that a company generates, (represented by net operating profit after taxes). [Initiating]

Cohen and Graham 2001, 217

9. c. Meeting management

Meeting management is an example of a facilitation technique used in developing the project charter as meetings may be held with key stakeholders and subject matter experts. Other facilitation techniques used to guide preparation of the charter are brainstorming, problem solving, and conflict resolution. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 71

10. b. Provide overall management of the project work

While all of the answers apply to the direct and manage project work process, the key benefit is that it involves providing overall management of the work of the project, encompassing the other answers listed. [Executing]

PMI®, *PMBOK® Guide*, 2013, 79

11. b. Guidelines and criteria

While you are managing a different type of project, the organization has managed projects before and therefore may have as part of its organizational process assets a project management template, which sets forth guidelines and criteria to tailor the organization's processes to satisfy specific needs of the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 75

12. d. Project statement of work

The project statement of work is a useful document as it describes the products, services, or results the project is to deliver. It references the business need, product scope description, and the strategic plan. [Initiating and Planning]

PMI®, *PMBOK® Guide*, 2013, 68, 78

13. a. Standardized guidelines and work instructions

Standardized guidelines and work instructions are an organizational process asset to consider as the project management plan is developed. They include guidelines and criteria to tailor the organization's set of standard processes to satisfy the specific needs of the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 75

- 14. b. Used to review, evaluate, approve, delay, or reject changes to the project

The change control board's powers and responsibilities should be well defined and agreed upon by key stakeholders. On some projects, multiple change control boards may exist with different areas of responsibility. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 96

- 15. b. Project management information systems

The items listed are part of these systems, a tool and technique in both processes. [Executing and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 84, 92

- 16. b. Updates

Change requests may include corrective actions, preventive actions, defect repairs, or updates. Updates are changes to formally controlled project documents or plans to reflect modified or additional content. [Executing]

PMI®, *PMBOK® Guide*, 2013, 85

17. a. Procedures that define how project documents may be changed

A change control system is a collection of formal, documented procedures that define the process used to control change and approve or reject changes to project documents, deliverables, or baselines. It includes the paperwork, tracking systems, and approval levels necessary to authorize changes. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 96

18. d. Project management plan

The project management plan describes how the project will be executed and monitored and controlled. While it contains a number of subsidiary plans, it also contains other items including information on key management reviews for contents, their extent, and timing to address open issues and pending decisions. [Planning]

PMI®, *PMBOK® Guide*, 2013, 77

19. d. Executing

Executing is where the majority of the budget is spent because this is the process where all of the resources (people, material, etc.) are applied to the activities and tasks in the project management plan. [Executing]

PMI®, *PMBOK® Guide*, 2013, 56

20. a. Project statement of work

The project statement of work describes in a narrative form the products, services, or results that the project will deliver. It references the product scope description as well as the business needs and the strategic plan. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 68

21. c. For successful completion of the current and subsequent project phases

Rolling wave planning provides progressive detailing of the work to be accomplished throughout the life of the project, indicating that planning and documentation are iterative and ongoing processes. [Planning]

PMI®, *PMBOK® Guide*, 2013, 45 and 560

22. d. Ensuring that project scope changes are reflected in changes to product scope

Integrated change control requires maintaining the integrity of baselines by releasing only approved changes into project products, services, or results. It also ensures that changes to product scope are reflected in the project scope definition. This is done by coordinating changes across the entire project. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 94 and 99–100

23. b. Does not apply to the product to be created

A project is completed when its objectives have been achieved or when they are recognized as being unachievable and the project is terminated. In this case, the end will occur when the product is finished. Thus, the concept of *temporary* applies to the project life cycle—not the product life cycle. [Planning]

PMI®, *PMBOK® Guide*, 2013, 3–4

24. d. Review the scope baseline

In closing the project, it is necessary to ensure that the project work is completed, and the project has met its objectives. Since project scope is measured against the project management plan, the project manager then reviews the scope baseline to ensure completion. [Closing]

PMI®, *PMBOK® Guide*, 2013, 101

25. a. Technical

Scope, time, and cost are examples of project baselines to be part of the project management plan.

PMI®, *PMBOK® Guide*, 2013, 76

26. a. Employees who can apply the training effectively

Most deliverables are tangible, such as buildings or roads, but intangible deliverables also can be provided. Work performance data are collected during direct and manage project work and is passed on to the controlling processes of each process area for further analysis. [Executing]

PMI®, *PMBOK® Guide*, 2013, 84–85

27. b. Corrective action

When you volunteered, you signed a confidentiality statement so you could not disclose what was under way on this activity. Now the Standard has been issued, and to stay in alignment with PMI®'s best practices, you need to issue a change request based on corrective action to realign the performance of the work of your project with your project management plan. [Executing]

PMI®, *PMBOK® Guide*, 2013, 85

28. a. During the initiating processes

When the project manager is selected and assigned to the project during initiation, several of the usual start-up tasks for a project are simplified. In addition, becoming involved with project activities from the beginning helps the project manager to understand where the project fits within the organization in terms of its priority relative to other projects and the ongoing work of the organization. [Initiating]

Meredith and Mantel 2012, 101; PMI®, *PMBOK® Guide*, 2013, 67

29. a. Useful information may be lost

Closure includes collecting project records, ensuring that the records accurately reflect final specifications, analyzing project or phase success and effectiveness, and archiving such information for future use. Each phase of the project should be properly closed while important project information is still available. [Closing]

PMI®, *PMBOK® Guide*, 2013, 100–101

30. c. Work performance data

Work performance data are the raw observations and measurements identified during activities performed to carry out the work of the project. Other examples are the reported percent of work physically completed, quality and technical performance measures, number of defects, actual costs, and actual durations. [Executing]

PMI®, *PMBOK® Guide*, 2013, 59

31. a. Overlap and interact throughout the project

Project management processes and product-oriented management processes must be integrated throughout the project's life cycle, given their close relationship. In some cases, it is difficult to distinguish between the two. For example, knowing how the project will be created aids in determining the project's scope. However, the project life cycle is independent from that of the product. [Executing]

PMI®, *PMBOK® Guide*, 2013, 38–39

32. d. Documentation that completed deliverables have been accepted

Documentation that the completed deliverables have been accepted is prepared as an output of validate scope. The close project or phase procedures provides a listing of necessary activities, including: confirmation that the project has met sponsor, customer, and other stakeholder requirements; satisfaction and validation that the completion and exit criteria have been met; the transfer of deliverables to the next phase or to production/operations has been accomplished; and activities to collect, audit, and archive project information and gather lessons learned have been addressed. [Closing]

PMI®, *PMBOK® Guide*, 2013, 100–103

33. c. A sponsor

The project charter should be issued by a project initiator or sponsor who formally authorizes the project and provides the project manager with the authority to apply organizational resources to project activities. The project charter should not be issued by the project manager, although, the project manager can assist in its development. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 71

34. c. Prepare a change request

The change request should detail the nature of the change and its effect on the project. Documentation is critical to provide a record of the change and who approved it, in case differences of opinion arise later. A change request is an output from the direct and manage project work process and an input to the perform integrated change control process. [Executing and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 85, 97

35. d. More rework

The question is an example of an overlapping relationship between phases. It is used to compress the schedule through fast tracking as an example. By overlapping phases more resources may be needed, risks may increase, and more rework may result if a significant phase progresses before accurate information is available from the previous phase. [Executing]

PMI®, *PMBOK® Guide*, 2013, 42–43

36. b. Predictive

If the product to be delivered is well understood, a predictive life cycle or one that is fully plan driven is recommended. The project's scope, time, and cost to deliver it are determined in the project life cycle as early as possible. [Planning]

PMI®, *PMBOK® Guide*, 2013, 44–45

37. c. Conduct an immediate review of the work packages

A thorough review of the work packages will provide a complete accounting of the physical progress achieved on the project. This is the first step in attempting to improve performance. [Closing]

Cleland and Ireland 2007, 365–375

38. c. There are misunderstandings regarding what was agreed upon by stakeholders

Using a formal, documented approach to change management reduces the level of misunderstanding or uncertainty regarding the nature of the change and its impact on cost and schedule. For large projects, change control boards are recommended. [Monitoring and Controlling]

Meredith and Mantel 2012, 500

39. b. There are new stakeholders.

As long as the new stakeholders agree with the project's business case, the work should continue. However, if any of the other events occur, termination should be considered. [Closing]

Cleland and Ireland 2007, 365–375

40. b. Configuration management plan

A configuration management plan is part of a project management plan to document how configuration management will be performed on the project.

PMI®, *PMBOK® Guide*, 2013, 77

Project Scope Management

Study Hints

The Project Scope Management questions on the PMP® certification exam cover a diverse, yet fundamental, set of project management topics. Planning scope management activities, collecting requirements, defining requirements with a scope statement, creating the WBS, validating the scope with accepted deliverables, and managing scope changes are among the topics covered.

PMI® views scope management as a six-step processes that consists of: plan scope management, collect requirements, define scope, create WBS, validate scope, and control scope. *PMBOK® Guide* Figure 5-1 provides an overview of the structure of Project Scope Management. Know this chart thoroughly.

The Project Scope Management questions on the exam are straightforward. Historically, most people have found these questions to be relatively easy; however, do not be lulled into a false sense of security by past results. These questions cover a wide breadth of material, and you must be familiar with the terminology and perspectives adopted by PMI®.

You also may wish to consult PMI®'s *Practice Standard for Work Breakdown Structures*—Second Edition (2006) for additional information.

Following is a list of the major Project Scope Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Plan Scope Management

- Preparing a scope management plan
- Preparing a requirements management plan

Collect requirements

- Tools and techniques
- Requirements documentation
- Requirements traceability matrix

Define scope

- Product analysis
- Alternatives analysis
- Facilitated workshops
- Project scope statement

Create WBS

- Benefits
- Uses
- Development/decomposition
- WBS dictionary
- Scope baseline

Validate scope

- Inspection
- Group decision-making techniques
- Accepted deliverables
- Change requests
- Work performance information

Control scope

- Variance analysis
- Work performance information
- Updates to the project management plan and to the project documents

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. Progressive elaboration of product characteristics on your project must be coordinated carefully with the—
 - a. Proper project scope definition
 - b. Project stakeholders
 - c. Scope change control system
 - d. Customer's strategic plan

2. You are examining multiple scope change requests on a project you were asked to take over because the previous project manager decided to resign. To assess the degree to which the project scope will change, you need to compare the requests to which project document?
 - a. Preliminary scope statement
 - b. WBS
 - c. Change management plan
 - d. Scope management plan

3. You and your project team recognize the importance of project scope management to a project's overall success; therefore, you include only the work required for successful completion of the project. The first step in the Project Scope Management process is to—
 - a. Clearly distinguish between project scope and product scope
 - b. Prepare a scope management plan
 - c. Define and document your stakeholders' needs to meet the project's objectives
 - d. Capture and manage both project and product requirements
4. An example of an organizational process asset that could affect how project scope is to be managed is—
 - a. Personnel administration
 - b. Marketplace conditions
 - c. Historical information
 - d. Organizational culture
5. You are managing a complex project for a new method of heating and air conditioning in vehicles. You will use both solar and wind technologies in this project to reduce energy costs. Therefore, you must ensure that the work of your project will result in delivering the project's specified scope, which means that you should measure completion of the product scope against the—
 - a. Scope management plan
 - b. Project management plan
 - c. Product requirements
 - d. Requirements management plan

6. A key tool and technique used in define scope is—
 - a. Templates, forms, and standards
 - b. Decomposition
 - c. Expert judgment
 - d. Project management methodology

7. Alternatives generation often is useful in defining project scope. An example of a technique that can be used is—
 - a. Sensitivity analysis
 - b. Decision trees
 - c. Mathematical model
 - d. Lateral thinking

8. Product analysis techniques include all the following EXCEPT—
 - a. Value engineering
 - b. Value analysis
 - c. Systems analysis
 - d. Bill of materials

9. The baseline for evaluating whether requests for changes or additional work are contained within or outside the project's exclusion is provided by the—
 - a. Project management plan
 - b. Project scope statement
 - c. Project scope management plan
 - d. WBS dictionary

10. Rather than use a WBS, your team developed a bill of materials to define the project's work components. A customer review of this document uncovered that a scope change was needed, because a deliverable had not been defined, and a change request was written subsequently. This is an example of a change request that was the result of—
 - a. An external event
 - b. An error or omission in defining the scope of the product
 - c. A value-adding change
 - d. An error or omission in defining the scope of the project
11. Collecting requirements is critical in project scope management as it becomes the foundation for the project's—
 - a. Scope management plan
 - b. WBS
 - c. Schedule
 - d. Scope change control system
12. The project scope statement addresses and documents all the following items EXCEPT—
 - a. Project exclusions
 - b. The relationship between the deliverables and the business need
 - c. Product scope description
 - d. Project management methodology (PMM)

13. The first step in collecting requirements on any project, large or small, is to—
 - a. Talk with the project stakeholders through interviews
 - b. Review the scope management plan
 - c. Conduct facilitated workshops with stakeholders
 - d. Prepare a requirements document template that you and your team can use throughout the collect requirements process
14. You want to structure your project so that each project team member has a discrete work package to perform. The work package is a—
 - a. Deliverable at the lowest level of the WBS
 - b. Task with a unique identifier
 - c. Required level of reporting
 - d. Task that can be assigned to more than one organizational unit
15. Quality function deployment is one approach for collecting requirements. Assume that you have studied the work of numerous quality experts, such as Deming, Juran, and Crosby, and your organization has a policy that states the importance of quality as the key constraint of all project constraints. You and your team have decided to use quality function deployment on your new project to manufacture turbines that use alternative fuels. The first step you should use is to—
 - a. Determine the voice of the customer
 - b. Build the house of quality
 - c. Address the functional requirements and how best to meet them
 - d. Hold a focus group of prequalified stakeholders

16. On the WBS, the first level of decomposition may be displayed by using all the following EXCEPT—
- a. Phases of the project life cycle
 - b. Subcomponents
 - c. Major deliverables
 - d. Project organizational units
17. Change is inevitable on projects. Uncontrolled changes are often referred to as—
- a. Rework
 - b. Scope creep
 - c. Configuration items
 - d. Emergency changes
18. Each WBS component should be assigned a unique identifier from a code of accounts to—
- a. Link the WBS to the bill of materials
 - b. Enable the WBS to follow a similar numbering system to that of the organization's units as part of the organizational breakdown structure
 - c. Sum costs, schedule, and resource information
 - d. Link the WBS to the project management plan
19. In scope control it is important to determine the cause of any unacceptable variance relative to the scope baseline. This can be done through—
- a. Root cause analysis
 - b. Control charts
 - c. Inspections
 - d. Project performance measurements

20. To assist your software development team in collecting requirements from potential users and to ensure that agreement about the stakeholders' needs exists early in the project, you decide to use a group creativity technique. Numerous techniques are available, but you and your team choose a voting process to rank the most useful ideas for further prioritization. This approach is known as—
- Brainstorming
 - Nominal group technique
 - Delphi technique
 - Affinity diagram
21. You have been appointed project manager for a new project in your organization and must prepare a project management plan. You decide to prepare a WBS to show the magnitude and complexity of the work involved. No WBS templates are available to help you. To prepare the WBS, your first step should be to—
- Determine the cost and duration estimates for each project deliverable
 - Identify and analyze the deliverables and related work
 - Identify the components of each project deliverable
 - Determine the key tasks to be performed
22. Assume that you are a major subcontractor doing work for a prime contractor on a major project. Your change control system should—
- Be identical to that of the prime contractor
 - Follow the rigor of international configuration management standards
 - Comply with relevant contractual provisions
 - Only consider approved change requests

23. You are leading a project team to identify potential new products for your organization. One idea was rejected by management because it would not fit with the organization's core competencies. You need to recommend other products using management's guideline as—
- a. An assumption
 - b. A risk
 - c. A specification
 - d. A technical requirement
24. Validate scope—
- a. Improves cost and schedule accuracy, particularly on projects using innovative techniques or technology
 - b. Is the last activity performed on a project before handoff to the customer
 - c. Documents the characteristics of the product or service that the project was undertaken to create
 - d. Differs from perform quality control in that validate scope is concerned with the acceptance—not the correctness—of the work results
25. Any step recommended to bring expected future performance in line with the project management plan is called—
- a. Performance evaluation
 - b. Corrective action
 - c. Preventive action
 - d. Defect repair

26. Written change requests should be required on—
- a. All projects, large and small
 - b. Only large projects
 - c. Projects with a formal configuration management system in place
 - d. Projects for which the cost of a change control system can be justified
27. Updates of organizational process assets that are an output of control scope include all the following EXCEPT—
- a. Causes of variations
 - b. Lessons learned
 - c. Work authorization system
 - d. Reasons certain corrective actions were chosen
28. Work performance information includes all the following EXCEPT—
- a. Started deliverables
 - b. Costs authorized and incurred
 - c. Progress of deliverables
 - d. Completed deliverables
29. Your project is now under way, and you are working with your team to prepare your requirements management plan. Which of the following strongly influences how requirements are managed?
- a. The phase-to-phase relationship
 - b. A set of procedures by which project scope and product scope may be changed
 - c. Requirements traceability matrix
 - d. Requirements documentation

30. You are project manager on a systems engineering project designed to last six years and to develop the next-generation corvette for use in military operations. You and your team recognize that requirements may change as new technologies, especially in sonar systems, are developed. You are concerned that these new technologies may lead to changes in the scope of your product, which then will affect the scope of your project. Therefore your requirements traceability matrix should include tracing requirements to all the following project elements EXCEPT—
- a. Business needs
 - b. Product design
 - c. Product development
 - d. Project verification
31. Your customer signed off on the requirements document and scope statement of your video game project last month. Today she stated she would like to make it an interactive game that can be played on a television and on a computer. This represents a requested scope change that, at a minimum—
- a. Should be reviewed according to the perform integrated change control process
 - b. Results in a change to all project baselines
 - c. Requires adjustments to cost, time, quality, and other objectives
 - d. Results in a lesson learned

32. The key inputs to the validate scope process include all the below items EXCEPT—
- a. The project management plan (scope management plan and scope baseline)
 - b. Change requests
 - c. Validated deliverables
 - d. Requirements traceability matrix
33. Modifications may be needed to the WBS and WBS dictionary because of approved change requests, which shows that—
- a. Repanning is an output of control scope
 - b. Scope creep is common on projects
 - c. Rebaselining will be necessary
 - d. Variance is relative to the scope baseline
34. You and your team are documenting requirements on your project to control fatigue as people need to work more hours to keep up with the competition. You decided to set up components for the requirements on your project. Acceptance criteria are an example of—
- a. Stakeholder requirements
 - b. Transition requirements
 - c. Project requirements
 - d. Business requirements
35. Which following item is NOT an input to control scope?
- a. Requirements traceability matrix
 - b. Work performance data
 - c. Deliverables
 - d. Scope management plan

36. You are the project manager for a subcontractor on a major contract. The prime contractor has asked that you manage your work in a detailed manner. Your first step is to—
 - a. Follow the WBS that the prime contractor developed for the project and use the work packages you identified during the proposal
 - b. Develop a subproject WBS for the work package that is your company's responsibility
 - c. Establish a similar coding structure to the prime contractor's to facilitate use of a common project management information system
 - d. Develop a WBS dictionary to show specific staff assignments
37. The project scope statement is important in scope control because it—
 - a. Is a critical component of the scope baseline
 - b. Provides information on project performance
 - c. Alerts the project team to issues that may cause problems in the future
 - d. Is expected to change throughout the project
38. The product scope description is documented as part of the project's scope statement. It is important to include it because it—
 - a. Facilitates the project acceptance process
 - b. Describes specific constraints associated with the project
 - c. Progressively elaborates characteristics
 - d. Shows various alternatives considered

39. How is a context diagram used?
- a. To depict product scope
 - b. To trace requirements as part of the traceability matrix
 - c. To develop the scope management plan
 - d. To develop the requirements management plan
40. You are establishing a PMO that will have a project management information system that will be an online repository of all program data. You will collect descriptions of all work components for each project under the PMO's jurisdiction. This information will form an integral part of the—
- a. Chart of accounts
 - b. WBS dictionary
 - c. WBS structure template
 - d. Earned value management reports

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d

21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. a. Proper project scope definition

Progressive elaboration of a project's specification must be coordinated carefully with proper scope definition, particularly when the project is performed under contract. When properly defined, the project scope—the work to be done—should remain constant even when the product characteristics are elaborated progressively. [Planning]

PMI®, *PMBOK® Guide*, 2013, 6, 107–108

2. b. WBS

The WBS, along with the detailed scope statement and the WBS dictionary, defines the project's scope baseline, which provides the basis for any changes that may occur on the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 131–132

3. b. Prepare a scope management plan

The work involved in the six Project Scope Management processes begins by preparing a scope management plan, which is a subsidiary plan for the project management plan. It describes the Project Scope Management processes from definition to control. [Planning]

PMI®, *PMBOK® Guide*, 2013, 109–110

4. c. Historical information

Organizational process assets that can influence plan scope management include formal and informal policies, procedures, and guidelines impacting project scope management. Historical information and the lessons learned knowledge base are other examples. [Planning]

PMI®, *PMBOK® Guide*, 2013, 109

5. c. Product requirements

Completion of the project scope is measured against the project management plan, and completion of the product scope is measured against the requirements. In the project context, product scope consists of features and functions that characterize the product, service, or result. Project scope is the work that must be done to deliver the product, service, or result with specified features and functions. [Planning]

PMI®, *PMBOK® Guide*, 2013, 106

6. c. Expert judgment

Expert judgment is used to analyze the information needed to develop a project scope statement. It is applied to any technical details. [Planning]

PMI®, *PMBOK® Guide*, 2013, 122

7. d. Lateral thinking

Lateral thinking, brainstorming, and analysis of alternatives are examples of alternatives generation that can be used to develop as many potential options as possible to execute and perform the project's work. [Planning]

PMI®, *PMBOK® Guide*, 2013, 123

8. d. Bill of materials

Product analysis techniques vary by application area, and each application area generally has accepted methods to translate project objectives into tangible deliverables and requirements. Other product analysis techniques include product breakdown, requirements analysis, and systems engineering. [Planning]

PMI®, *PMBOK® Guide*, 2013, 122

9. b. Project scope statement

Project exclusion identifies generally what is included within the project, and state explicitly what is excluded from the project, if a stakeholder might assume that a particular product, service, or result could be a project component. Project boundaries are described as part of the detailed project scope statement. [Planning]

PMI®, *PMBOK® Guide*, 2013, 123–124

10. b. An error or omission in defining the scope of the product

The bill of materials provides a hierarchical view of the physical assemblies, subassemblies, and components needed to build a manufactured product, whereas the WBS is a deliverable-oriented grouping of project components used to define the total scope of the project, providing a structured vision of what has to be delivered. Using a bill of materials where a WBS would be more appropriate may result in an ill-defined scope and subsequent change requests. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 125, 140; Ward 2008, 40

11. b. WBS

Collecting requirements provides the basis for defining project scope and product scope. It also involves determining, documenting, and managing stakeholder needs to meet project objectives. The requirements become the foundation for the WBS; moreover, cost, schedule, and quality planning are built upon the requirements. [Planning]

PMI®, *PMBOK® Guide*, 2013, 110, 127

12. d. Project management methodology (PMM)

The PMM is an organization-approved approach for project management that is used on every project. It is not part of the project scope statement, which describes the project scope, major deliverables, assumptions, and constraints. It describes the project's deliverables and the work required to complete them. [Planning]

PMI®, *PMBOK® Guide*, 2013, 123–124

13. b. Review the scope management plan

The scope management plan is reviewed first as it provides clarity as to how the project team will determine which requirements need to be collected on the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 113

14. a. Deliverable at the lowest level of the WBS

A work package is the lowest or smallest unit of work division in a project or WBS. The work package can be scheduled, cost estimated, monitored, and controlled. [Planning]

PMI®, *PMBOK® Guide*, 2013, 126

15. a. Determine the voice of the customer

Quality function deployment is an example of a facilitated workshop used in the manufacturing industry as a tool and technique to collect requirements. It helps to determine the critical characteristics for new product development and starts by collecting customer needs, known as the voice of the customer. [Planning]

PMI®, *PMBOK® Guide*, 2013, 114

16. d. Project organizational units

The WBS includes all work needed to be done to complete the project. The organizational breakdown structure (OBS) includes the organizational units responsible for completing the work. [Planning]

PMI®, *PMBOK® Guide*, 2013, 126, 548

17. b. Scope creep

Project scope creep is typically the result of uncontrolled changes. Scope control works to control the impact of any project scope changes. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 137

18. c. Sum costs, schedule, and resource information

The key document generated from the create WBS process is the actual WBS. Each WBS component is assigned a unique identifier to provide a structure for hierarchical summation of costs, schedule, and resource information. [Planning]

PMI®, *PMBOK® Guide*, 2013, 132

19. d. Project performance measurements

Variance analysis is a tool and technique for control scope. Project performance measurements are used to assess the magnitude of variance, to determine the cause of the variance, and to decide whether corrective or preventive action is required. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 139

20. b. Nominal group technique

The nominal group technique enhances brainstorming with a voting process, which is used to rank the most useful ideas for further brainstorming or for prioritization. [Planning]

PMI®, *PMBOK® Guide*, 2013, 115

21. b. Identify and analyze the deliverables and related work

Identifying and analyzing the deliverables and related work is the first step in the decomposition of a project. The deliverables should be defined in terms of how the project will be organized. For example, the major project deliverables may be used as the second level. [Planning]

PMI®, *PMBOK® Guide*, 2013, 128–129

22. c. Comply with relevant contractual provisions

In addition to complying with any relevant contractual provisions, scope change control must be integrated with the project's overall change control system and with any systems in place to control project and product scope. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 96, 137

23. a. An assumption

Assumptions are factors that, for planning purposes, are considered to be true, real, or certain without proof or demonstration. They are listed in the project scope statement. [Planning]

Ward 2008, 24; PMI®, *PMBOK® Guide*, 2013, 124 and 529

24. d. Differs from perform quality control in that validate scope is concerned with the acceptance—not the correctness—of the work results

Documentation that the customer has accepted completed deliverables is an output of validate scope. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 134

25. b. Corrective action

Recommended corrective action is an output from control scope. In addition to bringing expected future performance in line with the project management plan, it also serves to bring expected future performance in line with the project scope statement. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 140, 534

26. a. All projects, large and small

A system is needed for careful monitoring of changes made to the requirements. Use of written change requests encourages the individuals asking for changes to take responsibility for their requests and reduces frivolous requests that may adversely affect the project. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 94–97 140

27. c. Work authorization system

The work authorization system is not used in control scope. The others are examples of organizational process assets that may require update as a result of scope control. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 140

28. b. Costs authorized and incurred

Work performance information is an output of validate scope. It emphasizes deliverables—whether or not they have started, their progress, and ones that have finished or have been accepted. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 136

29. a. Phase-to-phase relationship

The requirements management plan defines how requirements will be analyzed, documented, and managed. It is strongly influenced by the phase-to-phase relationship. The project manager selects the most effective relationship for the project and documents it in the plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 42–44, 110

30. d. Project verification

The requirements traceability matrix is an output of the collect requirements process. It includes tracing requirements to business needs, opportunities, and objectives; project objectives; project scope: WBS deliverables; product design; product development; test strategy and scenarios; as well as high-level requirements to more detailed requirements. [Planning]

PMI®, *PMBOK® Guide*, 2013, 118–119

31. a. Should be reviewed according to the perform integrated change control process

A requested change is an output from the control scope process. Such a change should be handled according to the integrated change control process and may result in an update to the scope baseline or other components of the project management plan. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 140

32. b. Change request

The change requests are not an input of the validate scope process but are an output. The other items are all inputs to help the project manager validate the scope of the project. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2008, 124–125

33. d. Variance is relative to the scope baseline

Approved change requests will most likely impact and cause updates to the WBS, WBS dictionary, and project scope statement. In other words, they will cause variance to the scope baseline. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 139–140

34. c. Project requirements

Various components of requirements documentation can be used. Examples are: business requirements, stakeholder requirements, solution requirements, project requirements, and requirements assumptions, dependencies, and constraints. Project requirements consist of acceptance criteria and levels of service performance, safety, and compliance. [Planning]

PMI®, *PMBOK® Guide*, 2013, 117–118

35. c. Deliverables

Verified deliverables that are completed and checked for correctness are inputs to validate scope. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 135, 138–139

36. b. Develop a subproject WBS for the work package that is your company's responsibility

Work packages are items at the lowest level of the WBS. A subproject is a smaller portion of the original project when a project is subdivided into more manageable components or pieces. A subproject WBS then breaks down work packages into greater detail. A subproject WBS generally is used when the project manager assigns a scope of work to another organization, and the project manager at that organization must plan and manage the scope of work in greater detail. [Planning]

PMI®, *PMBOK® Guide*, 2013, 129, 564

37. a. Is a critical component of the scope baseline

The project scope statement, along with the WBS and WBS dictionary, is a key input to scope control. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 138

38. c. Progressively elaborates characteristics

The project scope statement describes the deliverables and the work required to create them. It also provides a common understanding of the scope among stakeholders. The product scope statement is a key component as it progressively elaborates the characteristics of the product, service, or result in the project charter and requirements documentation. [Planning]

PMI®, *PMBOK® Guide*, 2013, 123–124

39. a. To depict product scope

It is a tool and technique in collect requirements and is an example of a scope model. The context diagram visually depicts the product scope as it shows a business system (process, equipment, or computer, etc.) and how people and other systems (actors) interact with it. The diagram shows inputs to the business system, the actor(s) providing the input, outputs from the business system, and actor(s) receiving the output. [Planning]

PMI®, *PMBOK® Guide*, 2013, 117

40. b. WBS dictionary

The WBS dictionary typically includes a code of accounts identifier, a statement of work, responsible organization, a list of schedule milestones, associated schedule activities, required resources, cost estimates, quality requirements, acceptance criteria, technical references, and agreement information. [Planning]

PMI®, *PMBOK® Guide*, 2013, 132

Project Time Management

Study Hints

The Project Time Management questions on the PMP® certification exam focus heavily on the program evaluation and review technique (PERT), the critical path method (CPM), the precedence diagramming method (PDM), and the critical chain method; the differences between these four techniques; and the appropriate circumstances for their use. The exam tests your knowledge of how PERT/CPM networks are constructed, how schedules are computed, what the critical path is, and how networks are used to analyze and solve project scheduling, and resource allocation and leveling issues. There is a good chance that you will be presented with a network diagram that will be the subject of five or more questions. Therefore, detailed knowledge of network scheduling is essential. There also seems to be a focus on fast tracking as a method to accelerate the project schedule. You must know the advantages offered by networks over bar charts and network diagrams. You also should understand the concept of float (or slack) and how it presents challenges and opportunities to project schedulers.

Because a thorough understanding of networks and scheduling is required to successfully answer questions on

Project Time Management, you should take a course relating to that topic. If you cannot take a course, you may want to consult the user's manual for one of the more popular desktop software project management packages. Typically, you will find plenty of illustrations and short, easy-to-understand scheduling exercises at the level of detail required to correctly answer the exam questions. Another useful reference is PMI®'s *Practice Exam for Scheduling*—Second Edition (2011).

The *PMBOK® Guide* separates the function of Project Time Management into seven processes: plan schedule management, define activities, sequence activities, estimate activity resources, estimate activity durations, develop schedule, and control schedule. Review *PMBOK® Guide* Figure 6-1 before taking the practice test. Know this chart thoroughly.

Following is a list of the major Project Time Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Schedule management plan

Define activities

- Activity list
- Activity attributes
- Milestone list

Sequence activities

- PDM
- Dependencies
- Leads and lags
- Project schedule network diagrams

Estimate activity resources

- Expert judgment
- Alternative analysis
- Published estimating data
- Bottom-up estimating
- Activity resource requirements
- Resource breakdown structure
- Resource calendars

Estimate activity durations

- Expert judgment
- Analogous estimating
- Parametric estimates
- Three-point estimates
- Reserve analysis
- Group decision-making techniques
- Activity duration estimates

Develop schedule

- Schedule network analysis
- Critical path method
- Critical chain method
- Resource optimization techniques
- Leads and lags
- Crashing and fast-tracking
- Project schedule
- Schedule baseline
- Project calendars

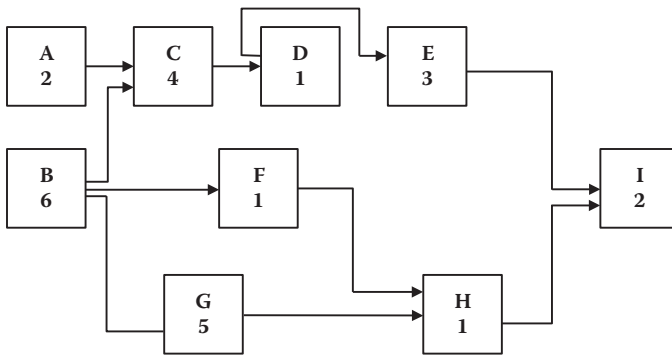
Control schedule

- Performance reviews
- Work performance information
- Change requests
- Updates
- Project management plan
- Project documents

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

Use the following network diagram to answer questions 1 through 4. Activity names and duration are provided.



1. What is the duration of the critical path in this network?
 - a. 10
 - b. 12
 - c. 14
 - d. 15

2. What is the float for Activity G?
 - a. -2
 - b. 0
 - c. 1
 - d. 4

3. If a project planner imposes a finish time of 14 on the project with no change in the start date or activity durations, what is the total float of Activity E?
 - a. -1
 - b. 0
 - c. 2
 - d. Cannot be determined

4. If the imposed finish time in question 3 above is removed and reset to 16 and the duration of Activity H is changed to 3, what is the late finish for Activity G?
 - a. -11
 - b. 11
 - c. -13
 - d. 13

5. Your company, which operates one of the region's largest chemical processing plants, has been convicted of illegally dumping toxic substances into the local river. The court has mandated that the required cleanup activities be completed by February 15. This date is an example of—
 - a. A key event
 - b. A milestone
 - c. A discretionary dependency
 - d. An external dependency

6. You are managing a construction project for a new city water system. The contract requires you to use special titanium piping equipment that is guaranteed not to corrode. The titanium pipe must be resting in the ground a total of 10 days before connectors can be installed. In this example, the 10-day period is defined as—
- Lag
 - Lead
 - Float
 - Slack
7. Of the following tools and techniques, which one is NOT used for schedule control?
- Fast tracking
 - What-if scenario analysis
 - Three-point estimates
 - Adjusting leads and lags
8. You are planning to conduct the team-building portion of your new project management training curriculum out-of-doors in the local park. You are limited to scheduling the course at certain times of the year, and the best time for the course to begin is mid-July. One of the more common date constraints to use as you develop the project schedule is—
- “Start no earlier than”
 - “Finish no earlier than”
 - “Fixed late start”
 - “Fixed early finish”

9. Project schedule development is an iterative process. If the start and finish dates are not realistic, the project probably will not finish as planned. You are working with your team to define how to manage schedule changes. You documented your decisions in which of the following?
- a. Schedule change control procedures
 - b. Schedule management plan
 - c. Schedule risk plan
 - d. Service-level agreement
10. If, when developing your project schedule, you want to define a distribution of probable results for each schedule activity and use that distribution to calculate another distribution of probable results for the total project, the most common technique to use is—
- a. PERT
 - b. Monte Carlo analysis
 - c. Linear programming
 - d. Concurrent engineering
11. Your lead engineer estimates that a work package will most likely require 50 weeks to complete. It could be completed in 40 weeks if all goes well, but it could take 180 weeks in the worst case. What is the PERT estimate for the expected duration of the work package?
- a. 45 weeks
 - b. 70 weeks
 - c. 90 weeks
 - d. 140 weeks

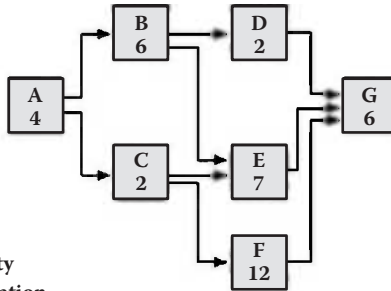
12. Your customer wants the project to be completed six months earlier than planned. You believe you can meet this target by overlapping project activities. The approach you plan to use is known as—
 - a. Critical chain
 - b. Fast tracking
 - c. Leveling
 - d. Crashing

13. Activity A has a duration of three days and begins on the morning of Monday the 4th. The successor activity, B, has a finish-to-start relationship with A. The finish-to-start relationship has three days of lag, and activity B has a duration of four days. Sunday is a nonworkday. Such data can help to determine—
 - a. The total duration of both activities is 8 days
 - b. Calendar time between the start of A to the finish of B is 11 days
 - c. The finish date of B is Wednesday the 13th
 - d. Calendar time between the start of A to the finish of B is 14 days

14. You can use various estimating approaches to determine activity durations. When you have a limited amount of information available about your project, especially when in the early phases, the best approach to use is—
 - a. Bottom-up estimating
 - b. Analogous estimating
 - c. Reserve analysis
 - d. Parametric analysis

15. “I cannot test the software until I code the software.”
This expression describes which of the following dependencies?
- a. Discretionary
 - b. Rational
 - c. Preferential
 - d. Mandatory or hard
16. Working with your team to provide the basis for measuring and reporting schedule progress, you agree to use the—
- a. Schedule management plan
 - b. Network diagram
 - c. Project schedule
 - d. Technical baseline
17. Your approved project schedule was based on resource leveling because of a scarcity of resources. Management has now mandated that the project be completed as soon as possible. Which of the following methods will you use to recalculate the schedule?
- a. Resource manipulation
 - b. Reverse resource allocation
 - c. Critical chain scheduling
 - d. Resource reallocation

18. Review the following network diagram and table. Of the various activities, which ones would you crash and in what order?



Letter = Activity
Number = Duration

Activity	Time Required, Weeks		Cost \$		Crashing Cost Per Weeks, \$
	Normal	Crash	Normal	Crash	
A	4	2	10,000	14,000	2,000
B	6	5	30,000	42,500	12,500
C	2	1	8,000	9,500	1,500
D	2	1	12,000	18,000	6,000
E	7	5	40,000	52,000	6,000
F	12	3	20,000	29,000	3,000
G	6	2	5,000	30,000	6,000

- A, C, E, and F
 - A, B, D, and F
 - A, B, E, and F
 - C, A, F, and G
19. You are remodeling your kitchen and decide to prepare a network diagram for this project. Your appliances must be purchased and available for installation by the time the cabinets are completed. In this example, these relationships are—
- Start-to-finish
 - Finish-to-start
 - Start-to-start
 - Finish-to-finish

20. Decomposition is a technique used for both WBS development and activity definition. Which following statement best describes the role decomposition plays in activity definition as compared to creating the WBS?
 - a. Final output is described in terms of work packages in the WBS.
 - b. Final output is described as deliverables or tangible items.
 - c. Final output is described as schedule activities.
 - d. Decomposition is used the same way in scope definition and activity definition.
21. When sequencing project activities in the schedule, all the following are true EXCEPT—
 - a. There may be scheduled dates for specific milestones
 - b. Every activity is connected to at least one predecessor and at least one successor
 - c. Lead or lag time may be required
 - d. Necessary sequencing of events may be described by the activity attributes
22. A schedule performance index of less than 1.0 indicates that the—
 - a. Project is running behind the monetary value of the work it planned to accomplish
 - b. Earned value physically accomplished thus far is 100%
 - c. Project has experienced a permanent loss of time
 - d. Project may not be on schedule, but the project manager need not be concerned

23. Various tools and techniques are available to sequence activities, and several factors can help to determine which tool or technique to select. When a project manager decides to include *sub-networks* or a *fragment network* as part of his or her scheduling technique, what does this decision say about the project?
- a. The work is unique requiring special network diagrams at various stages.
 - b. Software that manages resources is available over an existing electronic network.
 - c. Several identical or nearly identical series of activities are repeated throughout the project.
 - d. Multiple critical paths exist in the project.
24. To meet regulatory requirements, you need to crash your project schedule. Your first step is to compute—
- a. The cost and time slope for each critical activity that can be expedited
 - b. The cost of additional resources to be added to the project's critical path
 - c. The time saved in the overall schedule when tasks are expedited on the critical path
 - d. Three probabilistic time estimates of PERT for each critical path activity
25. Which one of the following is a key input to the define activities process?
- a. Project management plan
 - b. Project scope statement
 - c. Project scope baseline
 - d. Project charter

26. Unlike bar charts, milestone charts show—
 - a. Scheduled start or completion of major deliverables and key external interfaces
 - b. Activity start and end dates of critical tasks
 - c. Expected durations of the critical path
 - d. Dependencies between complementary projects

27. Project managers should pay attention to critical and subcritical activities when evaluating project time performance. One way to do this is to analyze 10 subcritical paths in order of ascending float. This approach is part of—
 - a. Variance analysis
 - b. Simulation
 - c. Earned value management
 - d. Trend analysis

28. An activity has an early start date of the 10th and a late start date of the 19th. The activity has a duration of four days. There are no nonworkdays. From the information given, what can be concluded about the activity?
 - a. Total float for the activity is nine days.
 - b. The early finish date of the activity is the end of the day on the 14th.
 - c. The late finish date is the 25th.
 - d. The activity can be completed in two days if the resources devoted to it are doubled.

29. In project development, schedule information such as who will perform the work, where the work will be performed, activity type, and WBS classification are examples of—
- Activity attributes
 - Constraints
 - Data in the WBS repository
 - Refinements
30. Which of the following is a key input to define activities?
- Project management plan
 - Project scope management plan
 - Schedule management plan
 - Project management software
31. The purpose of using what-if analysis in schedule control is to—
- Review scenarios to bring the schedule in line with the plan
 - Document requested changes
 - Provide additional details as to when the schedule baseline should be updated
 - Update the activity attributes
32. Several types of float are found in project networks. Float that is used by a particular activity and does NOT affect the float in later activities is called—
- Extra float
 - Free float
 - Total float
 - Expected float

33. All the following statements regarding critical chain method are true EXCEPT—
 - a. It modifies the schedule to account for limited resources
 - b. The first step is to use conservative estimates for activity durations
 - c. Duration buffers are added on the critical path
 - d. It focuses on managing buffer activity durations

34. You are managing a new technology project designed to improve the removal of hazardous waste from your city. You are in the planning phase of this project and have prepared your network diagram. Your next step is to—
 - a. Describe any unusual sequencing in the network
 - b. State the number resources required to complete each activity
 - c. Establish a project calendar and link it to individual resource calendar
 - d. Determine which schedule compression technique is the most appropriate, because your customer requests that the project be completed as soon as possible

35. The risk register may need to be updated as an output of which following process:
 - a. Define activities
 - b. Sequence activities
 - c. Estimate activity resources
 - d. Control schedule

36. You are managing a project that will use a virtual team with team members on three different continents. Your company is looking to use the virtual team to provide a lower cost product by using resources in countries that have a favorable exchange rate to that of your country. To assist in this process as you estimate resource requirements, it is helpful to consider—
- a. Bottom-up estimating
 - b. Published estimating data
 - c. Analogous estimating
 - d. Reserve analysis
37. Activity A has a pessimistic (*P*) estimate of 36 days, a most likely (*ML*) estimate of 21 days, and an optimistic (*O*) estimate of 6 days. What is the probability that activity A will be completed in 16 to 26 days?
- a. 55.70 percent
 - b. 68.26 percent
 - c. 95.46 percent
 - d. 99.73 percent
38. You are managing a project to redesign a retail store layout to improve customer throughput and efficiency. Much project work must be done on site and will require the active participation of store employees who are lifelong members of a powerful union with a reputation for labor unrest. One important component of your schedule must be—
- a. A resource capabilities matrix
 - b. Buffers and reserves
 - c. A resource calendar
 - d. A resource histogram

39. To account for uncertainty in a schedule, reserve analysis may be used. All the following are examples of contingency reserves EXCEPT—
- a. Fixed number of work periods
 - b. Percent of the estimated activity duration
 - c. Buffers
 - d. Productivity metrics
40. The reason that the schedule performance index (SPI) is shown as a ratio is to—
- a. Enable a detailed analysis of the schedule regardless of the value of the schedule variance
 - b. Distinguish between critical path and noncritical path work packages
 - c. Provide the ability to show performance for a specified time period for trend analysis
 - d. Measure the actual time to complete the project

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d

21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. d. 15

The total duration for the path B-C-D-E-I is 15.
The duration of any other path in the network is less than 15. [Planning]

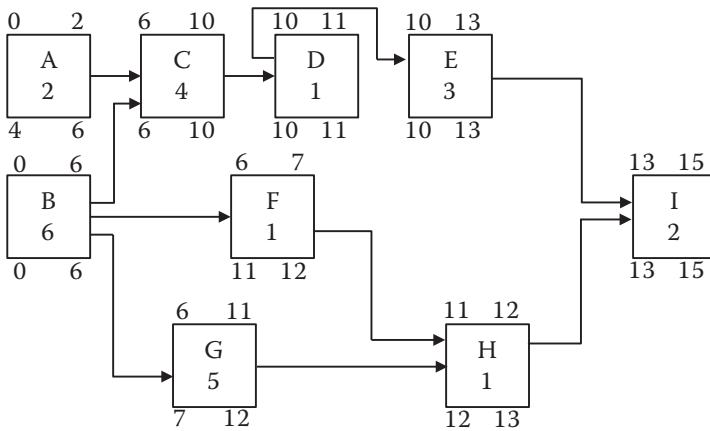
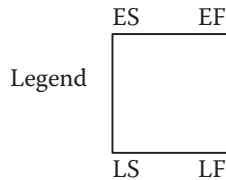
Meredith and Mantel 2012, Chapter 8

PMI®, PMBOK® Guide, 2013, 176–177

2. c. 1

Float = (late finish – early finish) or
(late start – early start)

Activity G LF = 12 $(12 - 11) = (1)$
 EF = 11
 LS = 7 $(7 - 6) = (1)$
 ES = 6



[Planning]

Meredith and Mantel 2012, Chapter 8

PMI®, PMBOK® Guide, 2013, 176–177

3. a. -1

The imposed finish date becomes the late finish for Activity I. The late dates for each activity need to be recalculated. The dates for Activity E become—

$$ES = 10$$

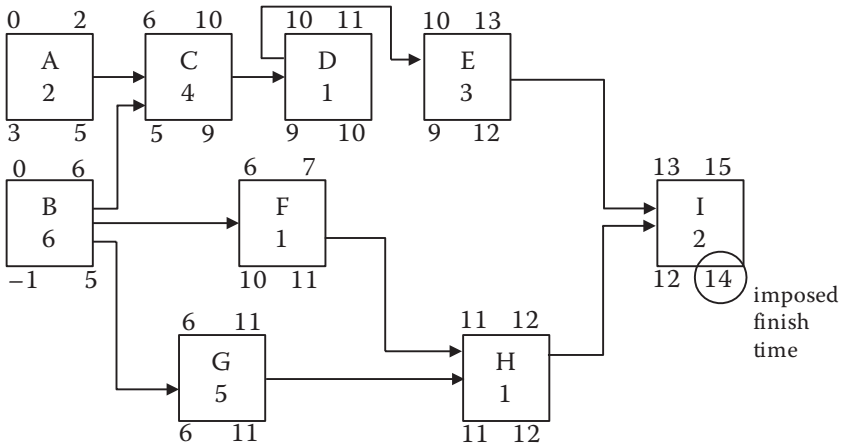
$$EF = 13$$

$$LS = 9$$

$$LF = 12$$

$$\text{Total float} = LS - ES \text{ or } 9 - 10 = (-1) \text{ or}$$

$$LS - EF \text{ or } 12 - 13 = (-1)$$



[Planning]

Meredith and Mantel 2012, Chapter 8

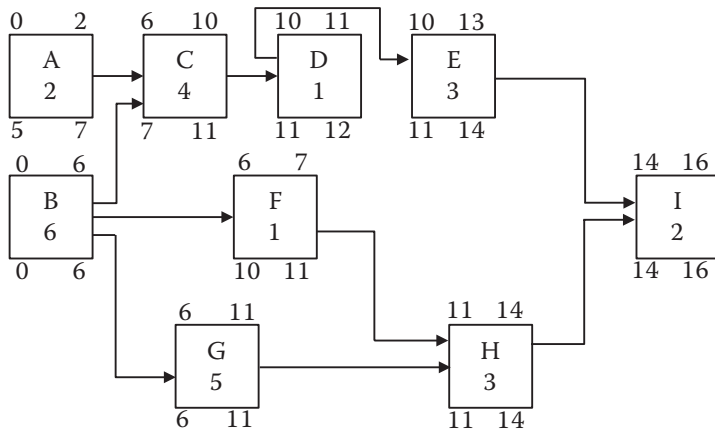
PMI®, PMBOK® Guide, 2013, 176–177

4. b. 11

The late dates for all activities need to be recalculated given the changed duration. Activity G's revised late dates are—

LF = 11

LS = 6



[Planning]

Meredith and Mantel 2012, Chapter 8

PMI®, *PMBOK® Guide*, 2013, 176–177

5. b. A milestone

A milestone is a significant point or event in the project. Milestones may be required by the project sponsor, customer, or other external factors for the completion of certain deliverables. They are similar to schedule activities, with the same structure and objectives, but they have zero duration as they represent a moment in time. [Planning]

PMI®, *PMBOK® Guide*, 2013, 153

6. a. Lag

For example, in a finish-to-start dependency with a 20-day lag, the successor activity cannot start until 20 days after the predecessor has finished. [Planning]

PMI®, *PMBOK® Guide*, 2013, 158–159

7. c. Three-point estimates

Three-point estimates are used to determine the estimates that go into the schedule. [Planning and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 170–171, 188–190

8. a. “Start no earlier than”

Imposed dates on schedule activity starts or finishes can be used to restrict the start or finish to occur either no earlier than a specified date or no later than a specified date. Although all four date constraints typically are available in project management software, “start no earlier than” and “finish no later than” constraints are more commonly used. [Planning]

PMI®, *PMBOK® Guide*, 2013, 543

9. b. Schedule management plan

The schedule management plan is part of the overall project management plan and defines, among other things, how schedule changes will be managed. Whether it is formal or informal, highly detailed or broadly framed, it generally is based on specific project needs. [Planning]

PMI®, *PMBOK® Guide*, 2013, 148–149

10. b. Monte Carlo analysis

What-if scenarios (simulation) is a tool and technique for developing schedules by which multiple project durations with different sets of activity assumptions are calculated. Monte Carlo analysis is the most commonly used simulation technique. [Planning]

PMI®, *PMBOK® Guide*, 2013, 180

11. b. 70 weeks

$$E(t) = \frac{\text{Optimistic} + (4 \times \text{Most likely}) + \text{Pessimistic}}{6}$$

$$= \frac{40 + 200 + 180}{6} = \frac{420}{6} = 70 \text{ weeks}$$

[Planning]

PMI®, *PMBOK® Guide*, 2013, 170–171

12. b. Fast tracking

Fast tracking is a way to accelerate the project schedule. [Planning]

PMI®, *PMBOK® Guide*, 2013, 181, 190, and 540

13. b. Calendar time between the start of A to the finish of B is 11 days

The duration of A, which is three, is added to the duration of B, which is four, for a total of seven. The three days between the activities is lag and not duration. The lag is a constraint and must be taken into account as part of the network calculations, but it does not consume resources. The total time by the calendar is 11 days as counted from the morning of Monday the 4th. The lag occurs over Thursday, Friday, and Saturday. Sunday is a nonworkday, so activity B does not start until Monday the 11th. Therefore, the calendar time is 11 days, and activity B ends on Thursday the 14th. [Planning]

PMI®, *PMBOK® Guide*, 2013, 156, 158–159, and 180

14. b. Analogous estimating

Although limitations exist with all estimating approach, analogous estimating is often used when there is a limited amount of information for the project. It uses historical information and expert judgment. [Planning]

PMI®, *PMBOK® Guide*, 2013, 169

15. d. Mandatory or hard

Mandatory dependencies may be required contractually or be inherent in the nature of the project work. They describe a relationship in which the successor activity cannot be started because of physical constraints until the predecessor activity has been finished. For example, software cannot be tested until it has been developed (or coded). They should not be confused with assigning schedule constraints in the scheduling tool. [Planning]

PMI®, *PMBOK® Guide*, 2013, 157

16. c. Project schedule

The approved project schedule is a key input to schedule control. It is the schedule baseline, as it is the approved version of a schedule model, and it provides the basis for measuring and reporting schedule performance. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 181,187

17. d. Resource reallocation

While resource leveling will often result in a project duration that is longer than the preliminary schedule as the original critical path probably will change and increase, it can also be used to get a schedule back on track by reassigning activities from noncritical to critical path activities. [Planning]

PMI®, *PMBOK® Guide*, 2013, 179

18. d. C, A, F, and G

First, it is necessary to determine the critical path, which is A, C, F, and G. To determine the lowest weekly crashing cost, start with C at \$1,500 per week. The next activity is A, followed by F and G. [Planning]

PMI®, *PMBOK® Guide*, 2013, 180; Kerzner 2009, 516–519

19. d. Finish-to-finish

The completion of the work of the successor activity depends upon the completion of the work of the predecessor activity. [Planning]

PMI®, *PMBOK® Guide*, 2013, 156

20. c. Final output is described as schedule activities.

In the create WBS process, final output is described as deliverables or tangible items. In the define activities process, final output is described as activities. [Planning]

PMI®, *PMBOK® Guide*, 2013, 151

21. b. Every activity is connected to at least one predecessor and at least one successor

The sequence activity process involves identifying and documenting relationships among the project activities. However, the last activity or milestone are not connected to at least one successor. [Planning]

PMI®, *PMBOK® Guide*, 2013, 156

22. a. Project is running behind the monetary value of the work it planned to accomplish

The SPI represents how much of the originally scheduled work has been accomplished at a given period in time, thus providing the project team with insight as to whether the project is on schedule. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 189–190, 224

23. c. Several identical or nearly identical series of activities are repeated throughout the project.

When identical network descriptions are repeated throughout a project, templates of those activities can be developed. If those series of tasks are repeated several times, the template can be updated several times. Software can be used with the templates to facilitate documenting and adapting them for future use. The sub-network or fragment tends to represent a sub-project or a work package and is often used to illustrate or study some potential or proposed schedule condition, such as a change in preferential schedule logic or the scope of the project. [Planning] PMI®, *PMBOK® Guide*, 2013, 564

24. a. The cost and time slope for each critical activity that can be expedited

$$\text{Slope} = (\text{Crash cost} - \text{Normal cost}) / (\text{Crash time} - \text{Normal time})$$
 This calculation shows the cost per day of crashing the project. The slope is negative to indicate that as the time required for a project or task decreases, the cost increases. If the costs and times are the same regardless of whether they are crashed or normal, the activity cannot be expedited. [Planning]

Meredith and Mantel 2012, 390; PMI®, *PMBOK® Guide*, 2013, 181

25. c. Project scope baseline

The scope baseline—made up of the scope statement, WBS, and WBS dictionary—is a key input to the define activities process and are used to develop the activity list that subsequently will help to create the schedule. [Planning]

PMI®, *PMBOK® Guide*, 2013, 151

26. a. Scheduled start or completion of major deliverables and key external interfaces

Milestones are singular points in time, such as the start or completion of a significant activity or group of activities. [Planning]

PMI®, *PMBOK® Guide*, 2013, 182

27. a. Variance analysis

Performance of variance analysis during the schedule monitoring process is a key element of time control. Float variance is an essential planning component for evaluating project time performance. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 189

28. a. Total float for the activity is nine days.

Total float or slack is computed by subtracting the early start date from the late start date, or $19 - 10 = 9$. To compute the early finish date given a duration of 4, we would start counting the activity on the morning of the 10th; therefore, the activity would be completed at the end of day 13, not 14 (10, 11, 12, 13). If we started the activity on its late start date on the morning of the 19th, we would finish at the end of day 22, not 25. Insufficient information is provided to determine whether this activity can be completed in 2 days if the resources are doubled. [Planning]

Meredith and Mantel 2012, 352–353; PMI®, *PMBOK® Guide*, 2013, 177

29. a. Activity attributes

Identifying activity attributes is helpful for further selection and sorting of planned activities. They are used for schedule development and for report formatting purposes. [Planning]

PMI®, *PMBOK® Guide*, 2013, 153

30. c. Schedule management plan

While there are a number of inputs to define activities, the schedule management plan is a key input. It shows the level of detail necessary to manage the work. [Planning]

PMI®, *PMBOK® Guide*, 2013, 150

31. a. Review scenarios to bring the schedule in line with the plan

A corrective action is anything that is done to bring expected future schedule performance in line with the schedule baseline. Regarding the project schedule, it usually means taking action to speed up the project. One way to determine why the schedule performance is not in line with the plan is what-if analysis, which may address schedule activities and other scenarios other than the activity that is actually causing the variance. It evaluates scenarios in order to predict their effect on the project's outcomes, either positive or negative. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 180, 186

32. b. Free float

Free float is defined as the amount of time an activity can be delayed without delaying the early start of any immediately succeeding activities. [Planning]

PMI®, *PMBOK® Guide*, 2013, 177

33. b. The first step is to use conservative estimates for activity durations

When using critical chain techniques, the initial project schedule is developed using duration estimates with required dependencies and defined constraints as inputs. [Planning]

PMI®, *PMBOK® Guide*, 2013, 178

34. a. Describe any unusual sequencing in the network

A summary narrative can accompany the schedule network diagram and describe the approach used to sequence the activities in the network. This narrative also should describe any unusual sequences in the network. [Planning]

PMI®, *PMBOK® Guide*, 2013, 159

35. b. Sequence activities

The risk register may require updates in both the sequence activities and develop schedule processes. In the sequence activity process, the activity lists and activity attributes may need updates as well. [Planning]

PMI®, *PMBOK® Guide*, 2013, 160, 185

36. b. Published estimating data

In estimating activity resources, published estimating data is a tool and technique that is used as many companies routinely publish updated production rates and unit costs of resources. This includes labor trades, material, and equipment for different countries and geographic locations in these countries. [Planning]

PMI®, *PMBOK® Guide*, 2013, 164

37. b. 68.26 percent

First, compute the standard deviation:

$$\sigma = \frac{P - O}{6} \text{ or } \frac{36 - 6}{6} = 5 \text{ days}$$

Next, compute PERT expected time:

$$\frac{P + 4(ML) + O}{6} \text{ or } \frac{36 + 4(21) + 6}{6} = 21 \text{ days}$$

Finally, determine range of outcomes using 1σ :

$$21 - 5 = 16 \text{ days, and } 21 + 5 = 26 \text{ days}$$

Simply defined, 1σ is the amount on either side of the mean of a normal distribution that will contain approximately 68.26 percent of the population.

[Planning]

Meredith and Mantel 2012, 348–350

38. c. A resource calendar

Project and resource calendars identify periods when work is allowed. Project calendars affect all resources. Resource calendars affect a specific resource or a resource category, such as a labor contract that requires certain workers to work on certain days of the week. [Planning]

PMI®, *PMBOK® Guide*, 2013, 163, 184, and 558

39. d. Productivity metrics

Duration estimates may include contingency reserves, and contingency should be identified clearly in schedule documentation. They are built into the overall project schedule to account for uncertainty. They also may be developed using quantitative analysis methods. When more information is known about the project, the contingency reserve may be used, reduced, or eliminated. [Planning]

PMI®, *PMBOK® Guide*, 2013, 171

40. c. Provide the ability to show performance for a specified time period for trend analysis

Because schedule performance index (SPI) and cost performance index (CPI) are expressed as ratios, they can be used to show performance for a specific time period or trends over a long-time horizon. [Monitoring and Controlling]

Kerzner 2009, 650–652

PMI®, *PMBOK® Guide*, 2013, 190, 219, and 224

Project Cost Management

Study Hints

You do not need to be a certified public accountant to successfully answer the Project Cost Management questions on the PMP® certification exam. PMI® addresses cost management from a project manager's perspective, which is much more general than that of an accountant. However, these questions are not easy. Far from it! Exam takers find the Project Cost Management questions more difficult than most of the others because they address such a broad range of cost issues (for example, cost estimating, earned value, and creating and interpreting S-curves) and require a significant amount of study time.

You may find questions relating to contract cost management. Because cost considerations are heavily affected by contract type, and Project Procurement Management is one of the ten *PMBOK® Guide* areas on which you will be tested, time spent studying that area will help to prepare you for the cost questions on the exam and vice versa.

The exam may include several questions that require you to know and solve specific, albeit simple, formulas. You *must* have a thorough knowledge of earned value—what it is and how it is computed. Study Table 7-1 as it provides information

on the formulas, how to calculate them, and how to interpret the results.

For additional information on project estimating, you may wish to review PMI®'s *Practice Standard for Project Estimating*, 2011. For additional information on earned value analysis from a PMI® perspective, you may also wish to consult PMI®'s *Practice Standard for Earned Value Management—Second Edition*, 2011.

PMI® views Project Cost Management as a four-step process comprising plan cost management, estimate costs, determine budgets, and control costs. See *PMBOK® Guide* Figure 7-1 for an overview of this structure. Know this chart thoroughly.

Important: PMI® allows the use of standard six-function (+, −, ×, ÷, √, %) business calculators. These calculators must be silent and have a self-contained power source. They are NOT to include a printing mechanism or a full alphabetic character set. Programmable calculators, which are instruments that can store mathematical formulas, are prohibited. The testing center will provide calculators for your use during the exam.

Following is a list of the major Project Cost Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Project cost management

Life-cycle cost (LCC)

Cost management plan

Estimate costs

- Scope baseline
- Human resource plan
- Project schedule
- Risk register
- Cost estimating methods
- Analogous estimating
- Parametric modeling
- Bottom-up estimating
- Three-point estimates
- Vendor bid analysis
- Reserve analysis
- Cost of quality
- Accuracy of estimates
- Order of magnitude
- Budget
- Definitive
- Direct versus indirect costs
- Contingency/management reserve
- Activity cost estimates
- Basis of estimates

Cost risk and contract type

Determine budgets

- Cost aggregation
- Reserve analysis
- Funding limit reconciliation

Cost baseline

Control costs

- Performance reviews
- Variance analysis
- Forecasting

Earned value management (EVM)

The most rudimentary building blocks

- Cost variance (CV)
- Schedule variance (SV)
- Cost performance index (CPI)
- Forecasting
- Schedule performance index (SPI)
- Budget at completion (BAC)
- Variance at completion (VAC)
- Estimate to complete (ETC)
- Estimate at completion (EAC)
- To-complete performance index (TCPI)

Earned value measurement techniques

- Weighted milestones
- Fixed formula
- Percent complete

Work performance measurements

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

You are using earned value progress reporting for your current project in an effort to teach your software developers the benefits of earned value. You plan to display project results on the cafeteria bulletin board so that the team knows how the project is progressing. Use the current status, listed below, to answer questions 1 through 4:

PV	=	\$2,200
EV	=	\$2,000
AC	=	\$2,500
BAC	=	\$10,000

1. According to earned value analysis, the SV and status of the project described above is—
 - a. $-\$300$; the project is ahead of schedule
 - b. $+\$8,000$; the project is on schedule
 - c. $+\$200$; the project is ahead of schedule
 - d. $-\$200$; the project is behind schedule
2. What is the CPI for this project, and what does it tell us about cost performance thus far?
 - a. 0.20; actual costs are exactly as planned
 - b. 0.80; actual costs have exceeded planned costs
 - c. 0.80; actual costs are less than planned costs
 - d. 1.25; actual costs have exceeded planned costs

3. The CV for this project is—
 - a. 300
 - b. -\$300
 - c. 500
 - d. -\$500
4. What is the EAC for this project, and what does it represent?
 - a. \$12,500; the revised estimate for total project cost (based on performance thus far)
 - b. \$10,000; the revised estimate for total project cost (based on performance thus far)
 - c. \$12,500; the original project budget
 - d. \$10,000; the original project budget
5. You have now prepared your cost management plan so now you are preparing your project's cost estimate. You decided to use analogous estimating. Which of the following is NOT characteristic of analogous estimating?
 - a. Supports top-down estimating
 - b. Is a form of expert judgment
 - c. Has an accuracy rate of $\pm 10\%$ of actual costs
 - d. Involves using the cost of a previous, similar project as the basis for estimating current project cost
6. All the following are outputs of the estimate cost process EXCEPT—
 - a. Activity cost estimates
 - b. Basis of estimates
 - c. Documented constraints
 - d. Cost baseline

7. You must consider direct costs, indirect costs, overhead costs, and general and administrative costs during cost estimating. Which of the following is NOT an example of a direct cost?
 - a. Salary of the project manager
 - b. Subcontractor expenses
 - c. Materials used by the project
 - d. Electricity

8. If the cost variance is the same as the schedule variance and both numbers are greater than zero, then—
 - a. The cost variance is due to the schedule variance
 - b. The variance is favorable to the project
 - c. The schedule variance can be easily corrected
 - d. Labor rates have escalated since the project began

9. You are responsible for preparing a cost estimate for a large World Bank project. You decide to prepare a bottom-up estimate because your estimate needs to be as accurate as possible. Your first step is to—
 - a. Locate a computerized tool to assist in the process
 - b. Use the cost estimate from a previous project to help you prepare this estimate
 - c. Identify and estimate the cost for each work package or activity
 - d. Consult with subject matter experts and use their suggestions as the basis for your estimate

10. Management has grown weary of the many surprises, mostly negative, that occur on your projects. In an effort to provide stakeholders with an effective performance metric, you will use the to-complete performance index (TCPI). Its purpose is to—
- Determine the schedule and cost performance needed to complete the remaining work within management's financial goal for the project
 - Determine the cost performance needed to complete the remaining work within management's financial goal for the project
 - Predict final project costs
 - Predict final project schedule and costs
11. If operations on a work package were estimated to cost \$1,500 and finish today but, instead, have cost \$1,350 and are only two-thirds complete, the cost variance is—
- \$150
 - \$150
 - \$350
 - \$500
12. When you review cost performance data on your project, different responses will be required depending on the degree of variance or control thresholds from the baseline. For example, a variance of 10 percent might not require immediate action, whereas a variance of 100 percent will require investigation. A description of how you plan to manage cost variances should be included in the—
- Cost management plan
 - Change management plan
 - Performance measurement plan
 - Variance management plan

13. As of the fourth month on the Acme project, cumulative planned expenditures were \$100,000. Actual expenditures totaled \$120,000. How is the Acme project doing?
 - a. It is ahead of schedule.
 - b. It is in trouble because of a cost overrun.
 - c. It will finish within the original budget.
 - d. The information is insufficient to make an assessment.
14. On your project, you need to assign costs to the time period in which they are incurred. To do this, you should—
 - a. Identify the project components so that costs can be allocated
 - b. Use the project schedule as an input to determine budget
 - c. Prepare a detailed and accurate cost estimate
 - d. Prepare a cost performance plan
15. You have a number of costs to track and manage because your project is technically very complex. They include direct costs and indirect (overhead) costs. You have found that managing overhead costs is particularly difficult because they—
 - a. Are handled on a project-by-project basis
 - b. Represent only direct labor costs
 - c. Represent only equipment and materials needed for the project
 - d. Are usually beyond the project manager's control
16. If you want to calculate the ETC based on your expectations that similar variances to those noted to date will not occur, you should use which of the following formulas?
 - a. $ETC = BAC - EV$
 - b. $ETC = (BAC - EV)/CPI$
 - c. $ETC = AC + EAC$
 - d. $ETC = AC + BAC - EV$

17. You receive a frantic phone call from your vice president who says she is going to meet with a prospective client in 15 minutes to discuss a large and complex project. She asks you how much the project will cost. You quickly think of some similar past projects, factor in a few unknowns, and give her a number. What type of estimate did you just provide?
- a. Definitive
 - b. Budget
 - c. Order-of-magnitude
 - d. Detailed
18. Your approved cost baseline has changed because of a major scope change on your project. Your next step should be to—
- a. Estimate the magnitude of the scope change
 - b. Issue a change request
 - c. Document lessons learned
 - d. Execute the approved scope change
19. Which of the following is a tool for analyzing a design, determining its functions, and assessing how to provide those functions' cost effectively?
- a. Pareto diagram
 - b. Value analysis
 - c. Configuration management
 - d. Value engineering
20. The cumulative CPI has been shown to be relatively stable after what percentage of project completion?
- a. 5% to 10%
 - b. 15% to 20%
 - c. 25% to 35%
 - d. 50% to 75%

21. The undistributed budget is part of the—
- Management reserve
 - Performance measurement baseline
 - Level-of-effort cost accounts
 - General and administrative accounts
22. It is expensive to lease office space in cities around the world. Office space can cost approximately USD \$80 per square foot in Tampa, Florida. And it can cost approximately ¥50,000 per square meter in Tokyo. These “averages” can help a person to determine how much it will cost to lease office space in these cities based on the amount of space leased. These estimates are examples of—
- Variance analysis
 - Parametric estimating
 - Bottom-up estimating
 - Reserve analysis
23. Your project manager has requested that you provide him with a forecast of project costs for the next 12 months. He needs this information to determine if the budget should be increased or decreased on this major construction project. In addition to the usual information sources, which of the following should you also consider?
- Cost estimates from similar projects
 - WBS
 - Project schedule
 - Costs that have been authorized and incurred

24. There are a number of different earned value management rules of performance measurement that can be established as part of the cost management plan. Which one of the following is NOT an example of such a rule?
 - a. Code of accounts allocation provision
 - b. Formulas to determine the ETC
 - c. Earned value credit criteria
 - d. Definition of the WBS level

25. Which of the following calculations CANNOT be used to determine EAC?
 - a. EV to date plus the remaining project budget
 - b. Accepts actual costs and predicts future ETC work will be done at the budgeted rate
 - c. Assumes what the program has experienced can be expected to continue
 - d. ETC will be performed at an efficiency rate considering both the CPI and SPI

26. Typically, the statement “no one likes to estimate, because they know their estimate will be proven incorrect” is true. However, you have been given the challenge of estimating the costs for your nuclear reactor project. A basic assumption that you need to make early in this process is—
 - a. How direct and indirect costs will be handled
 - b. Whether or not experts will be available to assist you in this process
 - c. If there will be a multiyear project budget
 - d. Whether the project has required delivery dates

27. By reviewing cumulative cost curves, the project manager can monitor—

- a. EV
- b. PV
- c. CVs
- d. CPI

28. Control accounts—

- a. Are charge accounts for personnel time management
- b. Summarize project costs at level 2 of the WBS
- c. Identify and track management reserves
- d. Represent the basic level at which project performance is measured and reported

29. Performance review meetings are held to assess schedule activity and work packages over-running or under-running the budget and to determine any estimated funds needed to complete work in progress. Typically, if EV is being used, all but which of the following information is determined?

- a. Variance analysis
- b. Trend analysis
- c. Time reporting systems
- d. Earned value performance

30. Overall cost estimates must be allocated to individual activities to establish the cost performance baseline. In an ideal situation, a project manager would prefer to prepare estimates—

- a. Before the budget is complete
- b. After the budget is approved by management
- c. Using a parametric estimating technique and model specific for that project type
- d. Using a bottom-up estimating technique

31. According to learning curve theory, when many items are produced repetitively—
- a. Unit costs decrease geometrically as production rates increase linearly
 - b. Unit costs decrease as production rates increase
 - c. Unit costs decrease in a regular pattern as more units are produced
 - d. Costs of training increase as the level of automation increases
32. The method of calculating the EAC by assuming the ETC work will be performed at the same cumulative CPI incurred by the project to date is used most often when—
- a. Current variances are viewed as atypical ones
 - b. Original estimating assumptions are no longer reliable because conditions have changed
 - c. Current variances are viewed as typical of future variances
 - d. Original estimating assumptions are considered to be fundamentally flawed
33. Increased attention to return on investment (ROI) now requires you to complete a financial analysis of the payback period on your project. Such an analysis identifies the—
- a. Ratio of discounted revenues over discounted costs
 - b. Future value of money invested today
 - c. Amount of time before net cash flow becomes positive
 - d. Point in time where costs exceed profit

34. A revised cost baseline may be required in cost control when—
- a. CVs are severe, and a realistic measure of performance is needed
 - b. Updated cost estimates are prepared and distributed to stakeholders
 - c. Corrective action must be taken to bring expected future performance in line with the project plan
 - d. EAC shows that additional funds are needed to complete the project even if a scope change is not needed
35. As project manager, you identified a number of acceptable tolerances as part of your earned value management system. During execution, some “unacceptable” variances occurred. After each “unacceptable” variance occurred, you did which one of the following first?
- a. Updated the budget
 - b. Prepared a revised cost estimate
 - c. Adjusted the project plan
 - d. Documented lessons learned
36. Assume that the project cost estimates have been prepared for each activity and the basis of these estimates has been determined. Now, as the project manager for your nutrition awareness program in your hospital, you are preparing your budget. Because you have estimates for more than 1,200 separate activities, you have decided to first—
- a. Aggregate these estimates by work packages
 - b. Aggregate these estimates by control accounts to facilitate the use of earned value management
 - c. Use the results of previous projects to predict total costs
 - d. Set your cost performance baseline

37. The cumulative cost curve for planned and actual expenditures—
- a. Helps to monitor project performance at a glance
 - b. Is used for calculating the CPI
 - c. Is also known as a histogram
 - d. Forecasts total project expenditures
38. The reason that the cost performance index (CPI) is shown as a ratio is to—
- a. Enable a detailed analysis of the schedule regardless of the value of the schedule variance
 - b. Distinguish between critical path and noncritical path work packages
 - c. Provide the ability to show performance for a specified time period for trend analysis
 - d. Measure the actual time to complete the project
39. Assume that your actual costs are \$800; your planned value is \$1,200; and your earned value is \$1,000. Based on these data, what can be determined regarding your schedule variance?
- a. At +\$200, the situation is favorable as physical progress is being accomplished ahead of your plan.
 - b. At -\$200, the physical progress is being accomplished at a slower rate than is planned, indicating an unfavorable situation.
 - c. At +\$400, the situation is favorable as physical progress is being accomplished at a lower cost than was forecasted.
 - d. At -\$200, you have a behind-schedule condition, and your critical path has slipped.

40. The CPI on your project is 0.84. This means that you should—
- a. Place emphasis on improving the timeliness of the physical progress
 - b. Reassess the life-cycle costs of your product, including the length of the life-cycle phase
 - c. Recognize that your original estimates were fundamentally flawed, and your project is in an atypical situation
 - d. Place emphasis on improving the productivity by which work was being performed

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
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31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. d. -\$200; the project is behind schedule

SV is calculated as $EV - PV$ (in this case, $\$2,000 - \$2,200$). A negative variance means that the work completed is less than what was planned for at that point in the project. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224

2. b. 0.80; actual costs have exceeded planned costs

CPI is calculated as EV/AC (in this case, $\$2,000/\$2,500$). EV measures the budgeted dollar value of the work that has actually been accomplished, whereas AC measures the actual cost of getting that work done. If the two numbers are the same, work on the project is being accomplished for exactly the budgeted amount of money (and the ratio will be equal to 1.0). If actual costs exceed budgeted costs (as in this example), AC will be larger than EV, and the ratio will be less than 1.0. CPI is also an index of efficiency. In this example, an index of 0.80 (or 80 percent) means that for every dollar spent on the project only 80 cents worth of work is actually accomplished. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224

3. d. -\$500

CV is calculated as $EV - AC$ (in this case, $\$2,000 - \$2,500$). A negative CV means that accomplishing work on the project is costing more than was budgeted. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224

4. a. \$12,500; the revised estimate for total project cost (based on performance thus far)

EAC is calculated as BAC/CPI (in this case, $\$10,000/0.80$). It is now known that the project will cost more than the original estimate of \$10,000. The project has been getting only 80 cents worth of work done for every dollar spent (CPI), and this information has been used to forecast total project costs. This approach assumes that performance for the remainder of the project will also be based on a CPI of 0.80. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224

5. c. Has an accuracy rate of $\pm 10\%$ of actual costs

A frequently used method of estimate costs, the analogous technique relies on experience and knowledge gained to predict future events. This technique provides planners with some idea of the magnitude of project costs but generally not within $\pm 10\%$. [Planning]

PMI®, *PMBOK® Guide*, 2013, 204–205

6. d. Cost baseline

Cost baseline is an output from the determine budget process. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 212–213

7. d. Electricity

Direct costs are incurred for the exclusive benefit of a project (for example, salary of the project manager, materials used by the project, and subcontractor expenses). Indirect costs, also called overhead costs, are allocated to a project by its performing organization as a cost of doing business. These costs cannot be traced to a specific project and are accumulated and allocated equitably over multiple projects (for example, security guards, fringe benefits, and electricity). [Planning]

PMI®, *PMBOK® Guide*, 2013, 202

8. b. The variance is favorable to the project

A positive schedule variance indicates that the project is ahead of schedule. A positive cost variance indicates that the project has incurred less cost than estimated for the work accomplished; therefore, the project is under budget. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224

9. c. Identify and estimate the cost for each work package or activity

Bottom-up estimating is derived by first estimating the cost of the project's elemental tasks at the lower levels of the WBS or for an activity and then aggregating those estimates at successively higher levels of the WBS for subsequent reporting and tracking purposes. [Planning]

PMI®, *PMBOK® Guide*, 2013, 205

10. b. Determine the cost performance needed to complete the remaining work within management's financial goal for the project

The TCPI takes the value of work remaining and divides it by the value of funds remaining to obtain the cost performance factor needed to complete all remaining work according to a financial goal set by management. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224

11. c. -\$350

CV is calculated by $EV - AC$, or $\$1,500(2/3) - \$1,350 = -\$350$. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224

12. a. Cost management plan

The management and control of costs focuses on variance thresholds. Certain variances are acceptable, and others, usually those falling outside a particular range, are unacceptable. They are typically expressed as percentage deviations from the baseline plan. The actions taken by the project manager for variances are described in the cost management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 199

13. d. The information is insufficient to make an assessment.

The information provided tells us that, as of the fourth month, more money has been spent than was planned. However, we need to know how much work has been completed to determine how the project is performing. In earned value terms, we are missing the EV. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 218

14. b. Use the project schedule as an input to determine budget

Accurate project performance measurement depends on accurate cost and schedule information. The project schedule includes planned start and finish dates for all activities tied to work packages and control accounts. This information is used to aggregate costs to the calendar period for which the costs are planned to be incurred. [Planning]

PMI®, *PMBOK® Guide*, 2013, 210

15. d. Are usually beyond the project manager's control

Overhead includes costs such as rent, insurance, or heating, that pertain to the project as a whole and cannot be attributed to a particular work item. The amount of overhead to be added to the project is frequently decided by the performing organization and is beyond the control of the project manager. [Monitoring and Controlling]

Meredith and Mantel 2012, 301

16. a. $ETC = BAC - EV$

This formula assumes that the estimate to complete is based on the same cost efficiency level. [Monitoring and Controlling]

Meredith and Mantel, 454

17. c. Order-of-magnitude

An order-of-magnitude estimate, which is referred to also as a ballpark estimate, has an accuracy range of -25% to 75% and is made without detailed data. [Planning]

PMI®, *PMBOK® Guide*, 2013, 201; Ward 2008, 295

18. b. Issue a change request

Before a revised cost baseline leading to a budget update can be prepared, it is necessary to issue a change request, which may include preventive or corrective action. These change requests then are reviewed and processed through the Perform Integrated Change Control process. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 225

19. d. Value engineering

Value engineering considers possible cost trade-offs as a design evolves. The technique entails identifying the functions that are needed and analyzing the cost effectiveness of the alternatives available for providing them. It helps optimize project life cycle costs, save time, increase profits, improve quality, increase market share, solve problems, and contribute toward more effective resource use [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 566

20. b. 15% to 20%

The CPI has been proven to be an accurate and reliable forecasting tool. Researchers have found that the cumulative CPI does not change by more than 10% once a project is approximately 20% complete. The CPI provides a quick statistical forecast of final project costs. [Monitoring and Controlling]

Fleming and Koppelman 2000, 134

21. b. Performance measurement baseline

The undistributed budget is applied to project work that has not yet been linked to WBS elements at or below the lowest level of reporting. It is, therefore, part of the performance measurement baseline and is expected to be used in the performance of project work. [Monitoring and Controlling]

Fleming and Koppelman 2000, 169, 206

PMI®, *PMBOK® Guide*, 2013, 205, 549

22. b. Parametric estimating

Parametric estimating involves using statistical relationships between historical data and other variables to calculate or estimate for activity parameters, such as cost, budget, or duration. The example is representative of a simple parametric model. [Planning]

PMI®, *PMBOK® Guide*, 2013, 205

23. d. Costs that have been authorized and incurred

These costs are part of work performance data about project progress. In addition data include information about project progress such as which activities have started, their progress, and which deliverables have finished Updating the budget requires knowledge about the actual costs spent to date, and any budget changes are approved according to the Perform Integrated Change Control process. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 216–217

24. a. Code of accounts allocation provision

Rules of earned value performance measurement are part of the cost management plan and may (1) define the points in the WBS where measurement of control accounts will be performed; (2) establish the EV measurement techniques such as weighted milestones, fixed-formula, percent complete, etc., to be used; and (3) specific tracking methods and EV equations for calculating the EAC forecasts to provide a validity check on the bottom-up EAC. [Planning]

PMI®, *PMBOK® Guide*, 2013, 199

25. a. EV to date plus the remaining project budget

EAC is a forecast of the most likely total value based on project performance and risk quantification. To calculate EAC, the AC of a project must be known and used in the calculation. Any calculation that relies solely on the EV will not yield an accurate measure of cost performance. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 220–221

26. a. How direct and indirect costs will be handled

The scope statement, as part of the scope baseline, is a key input in the estimate costs process and should be reviewed. It provides the project description, acceptance criteria, key deliverables, boundaries, assumptions, and constraints about the project. It also notes one basic assumption that must be made as costs are estimated is whether the estimates will be limited only to direct project costs or whether they also will include indirect project costs. [Planning]

PMI®, *PMBOK® Guide*, 2013, 202

27. c. CVs

Cumulative cost curves, or S-curves, enable the project manager to monitor cost variances at a glance. The difference in height between the planned-expenditure curve and the actual-expenditure curve represents the monetary value of variances at any given time. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 219

28. d. Represent the basic level at which project performance is measured and reported

Control accounts represent a management control point where scope, budget (resource plans), actual costs, and schedule are integrated and compared to earned value for performance measurement. [Planning]

PMI®, *PMBOK® Guide*, 2013, 132, 199, and 533

29. c. Time reporting systems

Variance analysis focuses on cost and schedule to help explain the cause, issue, and corrective action. Trend analysis examines project performance over time to determine performance status. Earned value performance compares the performance measurement baseline to actual schedule and cost performance. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 222–223

30. a. Before the budget is complete

Often project cost estimates are prepared after budgetary approval is provided. However, activity cost estimates should be prepared before the budget is complete. [Planning]

PMI®, *PMBOK® Guide*, 2013, 210

31. c. Unit costs decrease in a regular pattern as more units are produced

Learning curve theory indicates that human performance usually improves when a task is repeated. Specifically, each time output doubles, worker hours per unit decrease by a fixed percentage. This percentage is called the learning rate. [Planning]

Meredith and Mantel 2012, 301–303

32. c. Current variances are viewed as typical of future variances

Past performance is indicative of future performance; therefore, $EAC = BAC/CPI$. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 201

33. c. Amount of time before net cash flow becomes positive

Payback period analysis determines the time required for a project to recover the investment in it and become profitable. A weakness of this approach is a lack of emphasis on the magnitude of the profitability. [Planning]

Kerzner 2009, 614–615; PMI® *PMBOK® Guide*, 2013, 195; Ward 2008, 305

34. a. CVs are severe, and a realistic measure of performance is needed

After the CVs exceed certain ranges, the original project budget may be questioned and changed as a result of new information. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 226

35. d. Documented lessons learned

Lessons learned but not documented are “lessons lost.” The lessons learned knowledge database will help current project members, as well as people on future projects, make better decisions. Accordingly, the reasons for the variance, the rationale supporting the corrective action, and other related information must be documented. They require updates as part of updates to organizational process assets as an output of control costs in terms of corrective actions taken and why they were selected. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 226

36. a. Aggregate these estimates by work packages

The WBS provides the relationship among all the project deliverables and their components and should be reviewed before the budget is developed. As the budget is determined, the cost estimates for the activities should be aggregated by the work packages in the WBS. Then, later, they are aggregated for the control accounts and finally for the entire project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 213

37. a. Helps to monitor project performance at a glance

Cost curves for planned and actual expenditures are created by adding each month’s costs to the previous reporting period’s expenditures. By doing so, one can quickly see how the project is performing. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 219

38. c. Provide the ability to show performance for a specified time period for trend analysis

Because schedule performance index (SPI) and cost performance index (CPI) are expressed as ratios, they can be used to show performance for a specific time period or trends over a long-time horizon.

Additionally, there is no need to disclose confidential financial data to convey the project's status to one's customers; they should not have a need to know such information, unless there is a contractual requirement to do so. [Monitoring and Controlling]

Kerzner 2009, 665–666

PMI®, *PMBOK® Guide*, 2013, 219

39. b. At $-\$200$, the physical progress is being accomplished at a slower rate than is planned, indicating an unfavorable situation.

Schedule variance is calculated: $EV - PV$ or $\$1,000 - \$1,200 = -\$200$. Because the SV is negative, physical progress is being accomplished at a slower rate than planned. [Monitoring and Controlling]

Kerzner 2009, 648–649

PMI®, *PMBOK® Guide*, 2013, 218, 224

40. d. Place emphasis on improving the productivity by which work was being performed

$CPI = EV/AC$ and measures the efficiency of the physical progress accomplished compared to the baseline. A CPI of 0.84 means that for every dollar spent, you're only receiving 84 cents of progress. Therefore, you should focus on improving the productivity by which work is being performed. [Monitoring and Controlling]

Kerzner 2009, 650–652

PMI®, *PMBOK® Guide*, 2013, 219, 224

Project Quality Management

Study Hints

The Project Quality Management questions on the PMP® certification exam are straightforward—especially if you know definitions of terms and understand statistical process control. You are not required to solve quantitative problems, but there are questions on statistical methods of measuring and controlling quality.

The exam is likely to reflect a heavy emphasis on customer satisfaction and continuous improvement through the use of quality tools such as Pareto analysis and cause-and-effect diagrams. You must also know the differences among plan quality management, perform quality assurance, and perform quality control.

The *PMBOK® Guide* includes all quality-related activities under the term Project Quality Management, which comprises the three quality processes mentioned above. Review *PMBOK® Guide* Figure 8-1 for an overview of the Project Quality Management structure before taking the practice test. Know this chart thoroughly.

Following is a list of the major Project Quality Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Key *PMBOK® Guide* concepts

Quality defined

Quality management

Quality policy

Quality and grade

Accuracy and precision

Customer satisfaction

Prevention over inspection

Continuous improvement

SIPOC model

Management responsibility

Seven basic quality tools

- Cause-and-effect diagrams
- Flowcharts
- Checksheets
- Pareto diagrams
- Histograms
- Control charts
- Scatter diagrams

Plan quality management tools

- Cost-benefit analysis
- Benchmarking
- Design of experiments
- Cost of quality
- Statistical sampling
- Brainstorming
- Force field analysis
- Nominal group technique

Key quality planning documents

- Quality management plan
- Quality metrics
- Quality checklists
- Process improvement plan

Quality control measurements

Quality management and control tools

- Affinity diagrams
- Process decision program charts
- Interrelationship diagrams
- Tree diagrams
- Prioritization matrices
- Activity network diagrams
- Matrix diagrams

Quality audits

Process analysis

Quality control

- Variable sampling
- Attribute sampling
- Tolerances and control limits
- Prevention
- Probability
- Standard deviation
- Validated changes
- Verified deliverables

Approved change requests review

Impact of motivation on quality

Priority of quality versus cost and schedule

Design and quality

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. Quality is very important to your company. Each project has a quality statement that is consistent with the organization's vision and mission. Both internal and external quality assurance are provided on all projects to—
 - a. Ensure confidence that the project will satisfy relevant quality standards
 - b. Monitor specific project results to note whether they comply with relevant quality standards
 - c. Identify ways to eliminate causes of unsatisfactory results
 - d. Use inspection to keep errors out of the process
2. Benchmarking is a technique used in—
 - a. Inspections
 - b. Root cause analysis
 - c. Plan quality management
 - d. Perform quality control
3. In quality management, the practice “rework” is—
 - a. Acceptable under certain circumstances
 - b. An adjustment made that is based on quality control measurements
 - c. Action taken to bring a defective or nonconforming component into compliance
 - d. Not a concern if errors are detected early

4. The quality function deployment process is used to—
 - a. Provide better product definition and product development
 - b. Help products to succeed in the marketplace
 - c. Improve the functional characteristics of a product
 - d. Support production planning and the just-in-time approach
5. As it applies to quality, the law of diminishing returns says that—
 - a. 100% quality is unattainable
 - b. 100% inspection is not cost effective
 - c. Beyond a certain point, additional investment in quality has a negative ROI
 - d. Providing quality products will stop, or at least diminish, the number of returned items
6. You are leading a research project that will require between 10 and 20 aerospace engineers. Some senior-level aerospace engineers are available. They are more productive than junior-level engineers, who cost less and who are available as well. You want to determine the optimal combination of senior- and junior-level personnel. In this situation, the appropriate technique to use is to—
 - a. Conduct a design of experiments
 - b. Use the Ishikawa diagram to pinpoint the problem
 - c. Prepare a control chart
 - d. Analyze the process using a Pareto diagram

7. The purpose of the Taguchi method is to—
 - a. Manage the flow of material for better visibility and control
 - b. Use statistical techniques to compute a “loss function” to determine the cost of producing products that fail to achieve a target value
 - c. Design, group, and manage production operations as self-contained flexible cells capable of start-to-finish processing of a family of items
 - d. Regulate coordination and communication among process stages
8. Quality assurance promotes quality improvement. A “breakthrough” is the accomplishment of any improvement that takes the organization to unprecedented levels of performance by attacking—
 - a. Special causes of variation
 - b. Common causes of variation
 - c. Inspection over prevention
 - d. Specific tolerances
9. Which of the following statements best describes attribute sampling versus variables sampling?
 - a. Attribute sampling is concerned with prevention, whereas variables sampling is concerned with inspection.
 - b. Attribute sampling is concerned with conformance, whereas variables sampling is concerned with the degree of conformity.
 - c. Attribute sampling is concerned with special causes, whereas variables sampling is concerned with any causes.
 - d. Both are the same concept.

10. Your project scheduler has just started working with your project and has produced defective reports for the past two accounting cycles. If this continues, these defective reports could provide the potential for customer dissatisfaction and lost productivity that is due to rework. You discovered that the project scheduler needs additional training on using the scheduling tool that is used on your project. The cost of training falls under which one of the following categories?
- a. Overhead costs
 - b. Failure costs
 - c. Prevention costs
 - d. Indirect costs
11. When a process is within acceptable limits, it—
- a. Should not be adjusted
 - b. May not be changed to provide improvements
 - c. Shows differences caused by expected events or normal causes
 - d. Should not be inspected or reworked for any reason
12. The project team should have a working knowledge of statistical process control to help evaluate control quality outputs. Of all the topics involved, which of the following is the most important for the team to understand?
- a. Sampling and probability
 - b. Attribute sampling and variables sampling
 - c. Tolerances and control limits
 - d. Special causes and random causes

13. Rank ordering of defects should be used to guide corrective action. This is the underlying principle behind—
 - a. Trend analysis
 - b. Inspections
 - c. Control charts
 - d. Pareto diagrams

14. Project quality management was once thought to include only inspection or quality control. In recent years, the concept of project quality management has broadened. Which statement is NOT representative of the new definition of quality management?
 - a. Quality is designed into the product or service, not inspected into it.
 - b. Quality is the concern of the quality assurance staff.
 - c. Customers require a documented and, in some cases, registered quality assurance system.
 - d. National and international standards and guidelines for quality assurance systems are available.

15. Assume you wish to provide a process to be more creative in problem solving as on your project you have a somewhat complex scenario that possesses intertwined logical relationships for up to 50 items. The best approach is to—
 - a. Design an experiment
 - b. Use an interrelationship diagram
 - c. Conduct a Monte Carlo analysis
 - d. Use a process decision program chart

16. Your quality assurance department recently performed a quality audit of your project and identified a number of findings and recommendations. One recommendation seems critical and should be implemented because it affects successful delivery of the product to your customer. Your next step should be to—
- a. Call a meeting of your project team to see who is responsible for the problem
 - b. Reassign the team member who had responsibility for oversight of the problem
 - c. Perform product rework immediately
 - d. Issue a change request to implement the needed corrective action
17. Six sigma refers to the aim of setting tolerance limits at six standard deviations from the mean, whereas the normally expected deviation of a process is—
- a. One standard deviation
 - b. Two standard deviations
 - c. Three standard deviations
 - d. Undeterminable because of the unique nature of every process
18. You recognize the importance of quality control on your project. However, you also know that quality control has costs associated with it and that the project has a limited budget. One way to reduce the cost of quality control is to—
- a. Work to ensure that the overall quality program is ISO compliant
 - b. Use statistical sampling
 - c. Conduct inspections throughout the process
 - d. Use trend analysis

19. Deming's Fourteen Points provide a way for an organization to create and sustain a culture of continuous improvement. As such it should be directed by—
 - a. The project manager
 - b. Top management
 - c. Employees participating in quality circles
 - d. Stakeholders

20. Quality inspections also may be called—
 - a. Control tests
 - b. Walkthroughs
 - c. Statistical sampling
 - d. Checklists

21. Your management has prescribed that a quality audit be conducted at the end of every phase in a project. This audit is part of the organization's—
 - a. Quality assurance process
 - b. Quality control process
 - c. Quality improvement program
 - d. Process adjustment program

22. You are managing a major international project, and your contract requires you to prepare both a project plan and a quality management plan. Your core team is preparing a project quality management plan. Your first step in developing this plan is to—
 - a. Determine specific metrics to use in the quality management process
 - b. Identify the quality standards for the project
 - c. Develop a quality policy for the project
 - d. Identify specific quality management roles and responsibilities for the project

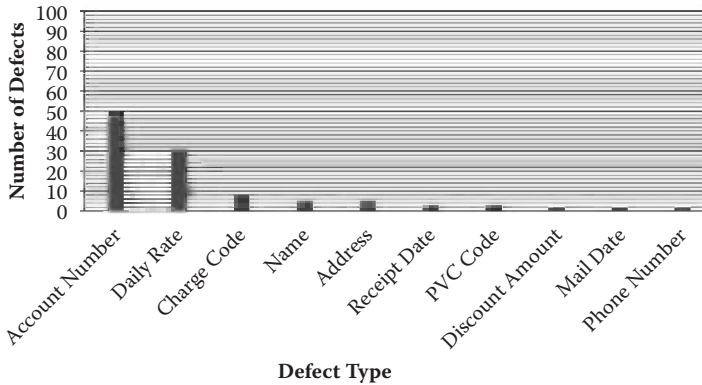
23. Recently your company introduced a new set of “metal woods” to its established line of golfing equipment. However, in the past weeks many of the clubs have been returned because of quality problems. You decide to conduct a failure mode and criticality analysis to—
- a. Analyze the product development cycle after product release to determine strengths and weaknesses
 - b. Evaluate failure modes and causes associated with the design and manufacture of this product
 - c. Evaluate failure modes and causes associated with the design and manufacture of a new product to replace the clubs
 - d. Help management set priorities in its existing manufacturing processes to avoid failures
24. The “rule of seven” as applied to statistical process control charts means that—
- a. Seven rejects typically occur per thousand inspections
 - b. Seven consecutive points are above or below the mean
 - c. At least seven inspectors should be in place for every thousand employees
 - d. A process is not out of control even though seven measurements fall outside the lower and upper control limits
25. Long-term contracting is an important aspect of project quality management because it—
- a. Provides incentives to vendors to make quality commitments
 - b. Improves quality through the use of benefit-cost ratio
 - c. Usually results in lower costs and increased profitability
 - d. Provides for periodic, yet mandatory quality audits

26. Even though your project is vastly different from a manufacturing operation, you believe the principles of *kaizen* will work well. The *kaizen* approach to continuous improvement emphasizes—
- a. The greater importance of customer satisfaction over cost
 - b. Radical changes in operating practices
 - c. Incremental improvement
 - d. The use of quality circles to improve morale
27. Results of quality control measurements are used—
- a. As an input to plan quality management
 - b. To prepare an operational definition
 - c. To prepare a control chart
 - d. As an input to perform quality assurance
28. The control chart is a tool used primarily to help—
- a. Monitor process variation over time
 - b. Measure the degree of conformance
 - c. Determine whether results conform
 - d. Determine whether results conform to requirements
29. The area where the project manager can have the greatest impact on the quality of his or her project is in—
- a. Quality planning
 - b. Quality assurance
 - c. Quality control
 - d. Quality improvement

30. You are a project manager for residential construction. As a project manager, you must be especially concerned with building codes—particularly in the plan quality management process. You must ensure that building codes are reflected in your project plans because—
- a. Standards and regulations are an input to plan quality management
 - b. Quality audits serve to ensure there is compliance with regulations
 - c. They are a cost associated with quality initiatives
 - d. Compliance with standards is the primary objective of perform quality control
31. You work as a project manager in the largest hospital in the region. Studies have shown that patients have to wait for long periods before being treated. To assist in identifying the factors contributing to this problem, you and your team have decided to use which of the following techniques?
- a. Cause-and-effect diagrams
 - b. Pareto analysis
 - c. Scatter diagrams
 - d. Control charts
32. The ISO 9000 standards provide—
- a. A description of how products should be produced
 - b. Specifics for the implementation of quality systems
 - c. A framework for quality systems
 - d. The maximum process requirements necessary to ensure that customers receive a good product

33. All of the following are objectives of a quality audit—
- Defect repairs have been implemented
 - Improvement opportunities are identified
 - Good practices can be introduced elsewhere
 - Root cause analysis has been performed as part of process analysis
34. There are three uses and types of Pareto analysis. If you wish to provide a measure of significance to factors that at first may not appear to be significant at all, you should use a—
- Basic Pareto analysis
 - Comparative Pareto analysis
 - Weighted Pareto analysis
 - Trend Pareto analysis
35. Constancy of purpose is a core concept for continuous improvement. An organization displaying constancy of purpose must have all the following elements EXCEPT—
- Documented and well-disseminated statements of purpose and vision
 - A set of strategic and tactical plans
 - An awareness by all members of the organization of the purpose, vision, goals, and objectives and their roles in achieving them
 - Separate quality assurance and quality control departments reporting to senior management
36. Quality objectives of the project are recorded in—
- Process improvement plan
 - Quality management plan
 - Quality baseline
 - Quality metrics

37. The below Pareto chart indicates defects in areas associated with billing a client for project services. Based on this Pareto analysis, which area, or areas, indicate the greatest opportunity for improvement?



- The account number, because if it is incorrect, the invoice may be sent to the wrong client.
 - The daily rate, because if it is incorrect, the total amount of the invoice will be wrong, which impacts the cash flow.
 - The charge code, name, address, receipt date, pvc code, discount amount, mail date, and phone number, because they are fairly easy to confirm and correct, thereby significantly reducing the types of defects.
 - The account number and daily rate, because they account for 80 percent of all defects.
38. You have decided to use a fishbone diagram to identify the relationship between an effect and its causes. To begin, you should first—
- Select an interdisciplinary team who has used the technique before to help brainstorm the problem
 - Determine the major categories of defects
 - Set up a process analysis using HIPO charts
 - Identify the problem

39. Assume that your project in the food service industry involves the need for the presence of the required food label as specified by the Food and Drug Administration. In this situation, you plan to use control charts as a quality control tool, so you should prepare a(n)—
- a. Variables chart
 - b. Attribute chart
 - c. Trend chart
 - d. Run chart
40. The quality management plan describes all the following EXCEPT the—
- a. Method for implementing the quality policy
 - b. Methods the team will use to meet the project's quality requirements
 - c. Efforts at the front end of a project to ensure that decisions are based on accurate information
 - d. Procedures used to conduct trade-off analyses among cost, schedule, and quality

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
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30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. a. Ensure confidence that the project will satisfy relevant quality standards

Quality assurance increases project effectiveness and efficiency and provides added benefits to project stakeholders. It includes all the planned and systematic quality activities to ensure that the project uses all the processes to meet requirements. Quality assurance should be performed throughout the project. [Executing]

PMI®, *PMBOK® Guide*, 2013, 227, 242–244

2. c. Plan quality management

Benchmarking involves comparing actual or planned practices to those practices of comparable projects to identify best practices, to note ideas for improvement, and to provide a way to measure performance. [Planning]

PMI®, *PMBOK® Guide*, 2013, 239

3. c. Action taken to bring a defective or nonconforming component into compliance

Rework is a frequent cause of project overruns. The project team must make every reasonable effort to control and minimize rework so that defective or nonconforming components are brought into compliance with requirements or specifications. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 559

4. a. Provide better product definition and product development

Quality function deployment helps a design team to define, design, manufacture, and deliver a product or service to meet or exceed customer needs. Its main features are to capture the customer's requirements, ensure cross-functional teamwork, and link the main phases of product development—product planning, part deployment, process planning, and production planning. [Planning]

Evans and Lindsay 2005, 568–569

PMI®, *PMBOK® Guide*, 2013, 556

5. c. Beyond a certain point, additional investment in quality has a negative ROI

If a company has paid \$100,000 to gain 98% quality and it would cost an additional \$25,000 to gain the other 2%, this is known as the law of diminishing returns. [Monitoring and Controlling]

Ward 2008, 240

6. a. Conduct a design of experiments

This technique is used to identify which variables have the most influence. It is a statistical method to identify the factors that may influence specific variables of a product or process under development or in production. For example, roller blade designers might want to determine which combination of number of wheels and titanium ball bearings would produce the most desirable “ride” characteristics at a reasonable cost. This technique, however, can be applied to project management issues such as cost and schedule trade-offs. An appropriately designed “experiment” often will help project managers to find an optimal solution from a relatively limited number of options, and often it help to determine the number and type of tests to use and their impact on quality. [Planning]

PMI®, *PMBOK® Guide*, 2013, 239–240

7. b. Use statistical techniques to compute a “loss function” to determine the cost of producing products that fail to achieve a target value

The Taguchi method is used to estimate the loss associated with controlling or failing to control process variability. It is based on the principle that by carefully selecting design parameters to produce robust designs, an organization can produce products that are more forgiving and tolerant. The tool helps determine the value or break-even point of improving a process to reduce variability. [Monitoring and Controlling]

Ward 2008, 432

8. b. Common causes of variation

Quality improvement includes action taken to increase project effectiveness and efficiency in order to provide added benefits to stakeholders. A breakthrough attacks chronic losses, or in Deming's terminology, common causes of variation. [Executing]

Evans and Lindsay 2005, 486

9. b. Attribute sampling is concerned with conformance, whereas variables sampling is concerned with the degree of conformity.

Attribute sampling determines whether a result does or does not conform. Variables sampling rates a result on a continuous scale to measure the degree of conformity. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 250

10. c. Prevention costs

Prevention costs include any expenditure directed toward ensuring that quality is achieved the first time. [Planning]

Rose 2005 8–9

PMI®, *PMBOK® Guide*, 2013, 235

11. a. Should not be adjusted

Processes should be changed only through established change procedures. If the process is outside acceptable limits, it should be adjusted. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 238, 252–253

12. a. Sampling and probability

Sampling and probability form the basis of statistical process control, which helps the team monitor project results for compliance with relevant quality standards so that methods can be identified to eliminate causes of unsatisfactory results. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 240, 252

13. d. Pareto diagrams

Pareto diagrams are histograms, ordered by frequency of occurrence, that show how many results were generated by type or category of identified cause. The project team should take action to fix the problems that are causing the greatest number of defects first. Pareto diagrams are based on Pareto's Law, which holds that a relatively small number of causes will typically produce a large majority of defects, also called the "solzo rule." [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 237,252

14. b. Quality is the concern of the quality assurance staff.

Quality concerns all levels of management and staff. Its success requires participation from all members of the project team with management providing the needed resources to succeed. [Planning, Executing, and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 227–229

15. b. Use an interrelationship diagram

In perform quality assurance, the interrelationship diagram can be used as a quality management and control tool. It may be developed from data generated by other quality tools such as the affinity diagram, the tree diagram, or the cause-and-effect diagram. It is an adoption of relationship diagrams. [Executing]

PMI®, *PMBOK® Guide*, 2013, 245

16. d. Issue a change request to implement the needed corrective action

The information obtained from a quality audit can be used to improve quality systems and performance. In most cases, implementing quality improvements requires preparation of change requests. [Executing]

PMI®, *PMBOK® Guide*, 2013, 247

17. c. Three standard deviations

When the results of a sample of items measured falls within three standard deviations and that sample is representative of the entire population, you can assume that more than 99% of all items fall within that range. This generally accepted range of results has been used by quality control professionals through the years. Six sigma is a program started by Motorola that, from a statistical standpoint, indicates a quality +standard of only 3.4 defects per million. [Planning and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 238, 252

Kerzner, 2009, 902

18. b. Use statistical sampling

Statistical sampling uses part of a population to draw conclusions about the total population. It is a well-proven technique that can significantly reduce the cost of quality control. [Monitoring and Controlling]+

PMI®, *PMBOK® Guide*, 2013, 240, 252

19. b. Top management

Deming is known as a quality pioneer. His approach to quality is not only statistically based but focuses on what management's responsibilities should be with respect to quality. His Fourteen Points for management are goals of quality for transforming business. [Executing]

Rose 2005, 28–29

20. b. Walkthroughs

Inspections comprise an examination of a work product to determine if it conforms to standards. Additional names for inspections are audits, reviews, or peer reviews (in some application areas, these terms may have narrow and specific meanings). [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 252

21. a. Quality assurance process

Quality assurance is a managerial function that establishes processes or procedures in an organization or project to assist in determining whether quality standards and operational definitions are being met. It is the application of planned, systematic quality activities to ensure that the project will use all processes needed to meet requirements and is performed throughout the life of the project. Quality audits are a tool and technique to use. [Executing]

PMI®, *PMBOK® Guide*, 2013, 242–243

22. c. Develop a quality policy for the project

The quality policy includes the overall intentions and direction of the organization with regard to quality, as formally expressed by top management. If the performing organization lacks a formal quality policy or if the project involves multiple performing organizations, as in a joint venture, the project management team must develop a quality policy for the project. The quality management plan then describes how the quality policies will be implemented. [Planning]

PMI®, *PMBOK® Guide*, 2013, 234, 241

23. c. Evaluate failure modes and causes associated with the design and manufacture of a new product to replace these clubs

This technique is a method of analyzing design reliability. A list of potential failure modes is developed for each element, and then each mode is given a numeric rating for frequency of occurrence, criticality, and probability of detection. These data are used to assign a risk priority number for prioritizing problems and guiding the design effort. [Monitoring and Controlling]

Evans and Lindsay 2005, 582–594

24. b. Seven consecutive measurements are above or below the mean

Consecutive points on a control chart that are above or below the mean or if a point exceeds a control limit indicate an abnormal trend in the process and must be investigated. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 228, 252

25. a. Provides incentives to vendors to make quality commitments

Vendors that have long-term relationships with buyers are generally more inclined to invest in process and quality improvement, because they have a higher probability of recovering their costs. The stability provided through longer-term contracts permits better planning and encourages better communication and partnering between the buyer and the seller. Long-term contracting with fewer vendors also reduces buyer-related costs by simplifying accounting, collections, and other administrative tasks. [Planning]

Rose 2005, 87–88

26. c. Incremental improvement

Imai, a Japanese engineer, coined the word kaizen to describe an approach to quality that means making small improvements every time a process is repeated. [Executing]

Evans and Lindsay 2005, 347—348

27. d. As an input to perform quality assurance

Quality control activities result in measurements that are used as inputs to the QA process. Such quality control measurements are used to evaluate and analyze the quality of the processes of the project against the organization's standards or specific requirements. They also compare processes used to create the measurements and validate actual measurements to determine their level of correctness. [Executing]

PMI®, *PMBOK® Guide*, 2013, 244

28. a. Monitor process variation over time

Used to monitor process variation and to detect and correct changes in process performance, the control chart helps people understand and control their processes and work. It enables the project manager, along with appropriate stakeholders, to identify points where corrective action can be taken to prevent unnatural performance. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 238, 252

29. b. Quality assurance

Quality assurance is the management section of quality management. It is the collective term for the formal activities and managerial processes that attempt to ensure that products and services meet the required quality level. The project manager should establish administrative processes and procedures necessary to ensure and often prove that the scope statement conforms to the customer's actual requirements, to determine which processes will be used to ensure that stakeholders have confidence that the quality activities will be properly performed, and to ensure that all legal and regulatory requirements will be met. [Executing]

Kerzner 2009, 888

30. a. Standards and regulations are an input to plan quality management

During the plan quality management process, the project management team must consider any application area-specific standards, regulations, rules, and guidelines that may affect the project as part of the enterprise environmental factors. Building codes are an example of regulations. [Planning]

PMI®, *PMBOK® Guide*, 2013, 28–29 and 234

31. a. Cause-and-effect diagrams

Cause-and-effect diagrams, also called Ishikawa diagrams or fishbone diagrams, are used to illustrate how various causes and subcauses interact to create a special effect. It is named for its developer, Kaoru Ishikawa. These diagrams are useful in linking the undesirable effects seen as special variation to the assigned cause, enabling project teams to implement corrective actions to eliminate the special variation shown in a control chart. [Monitoring and Controlling]

Ward 2008, 226

PMI®, *PMBOK® Guide*, 2013, 236, 252

32. c. A framework for quality systems

ISO 9000 provides a basic set of requirements for a quality system, without specifying the particulars for implementation. [Planning]

Evans and Lindsay 2005, 128–132

PMI®, *PMBOK® Guide*, 2013, 228–229

33. d. Root cause analysis has been performed as part of process analysis

The purpose of the quality audit is to determine if project activities comply with organizational policies, procedures, and processes. The quality audit has a number of objectives associated with it, but root cause analysis is part of process analysis to identify needed improvements in the process improvement plan. [Executing]

Kerzner 2009, 479

PMI®, *PMBOK® Guide*, 2013, 247

34. c. Weighted Pareto analysis

The weighted Pareto analysis gives a measure of significance to factors that may not appear significant at first, using such additional factors as cost, time, and criticality. A basic Pareto analysis identifies the vital few contributors that account for most quality problems, and the comparative Pareto analysis focuses on any number of program options or actions. [Monitoring and Controlling]

Kerzner 2009, 897–898

35. d. Separate quality assurance and quality control departments reporting to senior management

Top management should provide constancy of purpose so that it can be infused throughout the organization. Constancy of purpose also requires a shared belief among organization members that management's behavior clearly signals its commitment to and support of achievement of the vision. Quality assurance and control are functions that must be performed by everyone, not just those assigned to specific departments. [Executing]

Rose 2005, 29

36. b. Quality management plan

The quality management plan describes how the team will implement the quality policy, which describes the objectives of the project regarding quality management. [Planning]

PMI®, *PMBOK® Guide*, 2013, 241, 557

37. d. The account number and daily rate, because they account for 80 percent of all defects.

Pareto analysis focuses on what Joseph Juran called the vital few. Named after Vilfredo Pareto, an Italian economist whose studies showed that 80 percent of the wealth was held by 20 percent of the population, quality analysis typically shows that 80 percent of the all problems (defects) are found in 20 percent of the items or areas studied.

Rose 2005, 86–87

PMI®, *PMBOK® Guide*, 2013, 237, 548

38. d. Identify the problem

The first and most important is to identify the problem as a gap to be closed or as an objective to be achieved. Causes then are found by looking at the problem statement and asking why until a root cause has been identified for which action can be taken or the reasonable possibilities on the diagram have been exhausted. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 236, 252

Kerzner 2009, 895–898

39. b. Attribute chart

There are two types of control charts: variable charts, which are used with continuous data, and attribute charts, for use with discrete data. Attribute data have only two values (conforming/nonconforming, pass/fail, go/no-go, or present/absent). In this situation, you are looking for the presence of the required food label. [Monitoring and Controlling]

Kerzner 2009, 905

40. d. Procedures used to conduct trade-off analyses among cost, schedule, and quality

A part of the overall project management plan, the quality management plan should address all aspects of how quality management will be implemented on the project and how the project team will implement the quality policy. Trade-off analyses are business judgments and, as such, are not procedural steps to be included in the quality management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 241

Project Human Resource Management

Study Hints

The Project Human Resource Management questions on the PMP® certification exam focus heavily on organizational structures, roles and responsibilities of the project manager, team building, and conflict resolution. Many of the questions are taken from the *PMBOK® Guide* and the following PMI® handbooks, which have been consolidated into one publication available from PMI® entitled *Principles of Project Management* (1997).

- Conflict Management for Project Managers *by John R. Adams and Nicki S. Kirchof*
- Organizing for Project Management *by Dwayne P. Cable and John R. Adams*
- Roles and Responsibilities of the Project Manager *by John R. Adams and Brian W. Campbell*
- Team Building for Project Managers *by Linn C. Stuckenbruck and David Marshall*
- The Project Manager's Work Environment: Coping with Time and Stress *by Paul C. Dinsmore, Martin Dean Martin, and Gary T. Huettel*

Appendix X3 *PMBOK® Guide* also should be reviewed along with six other publications it mentions:

- Essential People Skills for Project Managers *by Ginger Levin and Steven Flannes*
- Organizing Projects for Success, *vol. 1 of The Human Aspects of Project Management by Vijay K. Verma*
- Human Factors in Project Management (Revised Edition) *by Paul C. Dinsmore*
- Human Resource Skills for the Project Manager, *vol. 2 of The Human Aspects of Project Management by Vijay K. Verma*
- Managing the Project Team, *vol. 3 of The Human Aspects of Project Management by Vijay K. Verma*
- Seven Habits of Highly Effective People *by Stephen R. Covey*

In contrast to other areas of the *PMBOK® Guide* in which commonly known terms are used, some terminology developed for Project Human Resource Management appears to be peculiar to PMI®. (In fact, much of the terminology has been used in project management literature for many years, but that literature has not always been widely disseminated.) For example, in the area of project organizational structures, some experts with years of experience in the field have not encountered such terms or concepts as *project expeditor* or *weak matrix*. Accordingly, committing to memory PMI®'s definition and classification of the following subject areas is imperative:

- Project organizational structures
- Stages of team development
- Decision-making guidelines
- Influencing guidelines
- Negotiation skills
- Conflict management concepts

In spite of the unfamiliarity of some of the terminology, most exam takers do not find the human resource questions on the exam difficult.

PMI® views Project Human Resource Management as having four elements: plan human resource management, acquire project team, develop project team, and manage project team. See *PMBOK® Guide* Figure 9-1 for an overview of this structure. Know it cold!

Following is a list of the major Project Human Resource Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Forms of organization

- Functional
- Project expeditor
- Project coordinator
- Weak matrix
- Strong matrix
- Balanced matrix
- Projectized
- Composite

Plan human resource management plan tools and techniques

- Organization chart and position descriptions
- Hierarchical-type charts
- Matrix-based charts
- Text-oriented formats
- Networking
- Organizational theory
- Expert judgment

Develop human resource management plan outputs

- Human resource management plan
- Roles and responsibilities
- Staffing management plan
- Project organization charts

Acquire project team

Project manager roles and responsibilities

- Functions
- Roles
- Negotiation

Types of power

Acquisition

Multi-criteria decision analysis

Virtual teams

Project staff assignments

Resource calendars

Develop project team objectives

Interpersonal skills

- Communication skills
- Emotional intelligence
- Conflict resolution
- Negotiation
- Influence
- Team building
- Group facilitation

Training

Team-building activities

- Approaches
- Stages of team development
- Goals and results of project team building
- Symptoms of poor teamwork
- Ground rules for project team building
- The team-building process

Ground rules

Motivation theories

- Maslow's Hierarchy of Needs
- McGregor's Theory X and Theory Y
- Herzberg's Theory of Motivation
- Expectancy Theory
- McClelland Needs Theory

Collocation

Reward and recognition systems

Performance assessment tools

Team performance assessment

Manage Project Team

- Project conflict
- Why conflict is unavoidable on projects
- Seven sources of conflict in project environments
- Conflict and the project life cycle
- Conflict management
- Problem solving or collaborating
- Compromising or reconciling
- Smoothing or accommodating
- Withdrawal or avoiding
- Forcing or directing

Observation and conversation

Project performance appraisals

Interpersonal skills

- Leadership
- Influencing
- Effective decision making

Political and cultural awareness

Trust building

Coaching

Change requests

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. You have been assigned as project manager on what could be a “bet the company” project. You realize that to be successful you need to exercise maximum control over project resources. Which form of project organization should you establish for this project?
 - a. Strong matrix
 - b. Projectized
 - c. Project coordinator
 - d. Weak matrix

2. Which of the following is a ground rule for project team building?
 - a. Perform frequent performance appraisals
 - b. Ensure that each team member reports to his or her functional manager in addition to the project manager
 - c. Start early
 - d. Try to solve team political problems

3. Project A is being administered using a matrix form of organization. The project manager reports to a senior vice president who provides visible support to the project. In this scenario, which of the following statements best describes the relative power of the project manager?
 - a. The project manager will probably not be challenged by project stakeholders.
 - b. In this strong matrix, the balance of power is shifted to the functional line managers.
 - c. In this tight matrix, the balance of power is shifted to the project manager.
 - d. In this strong matrix, the balance of power is shifted to the project manager.
4. You are leading a team to recommend an equitable reward and recognition system for project managers. Before finalizing the plan, you want to ensure that executives understand the basic objective of reward systems. This objective is to—
 - a. Be comparable with the award system established for functional managers to indicate parity and to show the importance of project management to the company
 - b. Make the link between project performance and reward clear, explicit, and achievable
 - c. Motivate project managers to work toward common objectives and goals as defined by the company
 - d. Attract people to join the organization's project management career path
5. Which of the following factors contributes the most to team communication?
 - a. External feedback
 - b. Performance appraisals
 - c. Smoothing over of team conflicts by the project manager
 - d. Collection

6. You are managing a virtual team. The project has been under way for several months, and you believe your team members do not view themselves as a team or a unified group. To help rectify this situation, you should—
 - a. Ensure that every member of the project team uses e-mail as a form of communication
 - b. Mandate that the team follow the vision and mission statement of his or her organization
 - c. Enhance communications planning
 - d. Provide team members with the latest in communications technology and mandate its use
7. Major difficulties arise when multiple projects need to be managed in the functional organizational structure because of—
 - a. The level of authority of the project manager
 - b. Conflicts over the relative priorities of different projects in competition for limited resources
 - c. Project team members who are focused on their functional specialty rather than on the project
 - d. The need for the project manager to use interpersonal skills to resolve conflicts informally
8. The team you have organized for your new project consists of three people who will work full-time and five people who will support the project on a part-time basis. All team members know one another and have worked together in the past. To ensure a successful project start-up, your first step should be to—
 - a. Meet with each team member individually to discuss assignments
 - b. Prepare a responsibility assignment matrix and distribute it to each team member
 - c. Distribute the project plan and WBS to the team
 - d. Hold a project kickoff meeting

9. Your organization is characterized by hierarchical organizational structures with rigid rules and policies and strict supervisory controls. Individual team members are not expected to engage in problem solving or use creative approaches to plan and execute work; management does that. Your organization is characterized by which one of the following theories?
- a. Ouchi's Theory
 - b. McGregor's Theory X
 - c. Maslow's self-esteem level
 - d. Vroom's Expectancy Theory
10. As you prepare your human resource plan, you need to determine the skill and capacity required to complete the activities in the project. This should be documented in the—
- a. Roles and responsibilities section
 - b. Staffing management plan
 - c. Staff acquisition section
 - d. Compliance section
11. The primary result of effective team development is—
- a. Improved project performance
 - b. An effective, smoothly running team
 - c. An understanding by project team members that the project manager is ultimately responsible for project performance
 - d. Enhancement of the ability of stakeholders to contribute as individuals and team members

12. The team members on your project have been complaining that they do not have any sense of identity as a team because they are located in different areas of the building. To remedy this situation, you developed a project logo and had it printed on T-shirts to promote the project, but this action has not worked. Your next step is to—
- a. Initiate a newsletter
 - b. Create an air of mystery about the project
 - c. Establish a “team meeting room”
 - d. Issue guidelines on how team members should interact with other stakeholders
13. The project team directory is an output from which of the following processes?
- a. Develop project team
 - b. Acquire project team
 - c. Develop human resource management plan
 - d. Manage project team
14. You realize that leadership without management or management without leadership probably will produce poor project results. Which one of the following key responsibilities best represents project leadership?
- a. Developing a vision and strategy, and motivating people to achieve them
 - b. Getting things done through other people
 - c. Using charismatic power to motivate others even if they do not like the work
 - d. Using all types of power, as appropriate, as motivational tools

15. Given that you are neighbors, you and the CEO of your company have established a friendly personal relationship. Recently your company appointed you project manager for a new project that is crucial to achieving next year's financial targets. Which type of power available to project managers might you be able to rely upon?
- a. Referent
 - b. Reward
 - c. Formal
 - d. Expert
16. You have been a project manager for seven years. You now are managing the construction of a new facility that must comply with the government's newly issued environmental standards. You want to ensure that your team members are able to select methods to complete various activities on the project without needing to involve you in each situation. As you prepare your human resource management plan, you should document this information in which of the following—
- a. Roles and responsibilities section
 - b. Resource assignment matrix
 - c. Resource breakdown structure
 - d. Staffing management plan

17. It is important on all projects to determine when and how human resources will be met. Assume that you are managing a project to assess methods for streamlining the regulatory approval process for new medical devices in your government agency. Because the agency has undergone downsizing during the past three years, subject matter experts are in short supply. You must determine whether the needed subject matter experts can be acquired from inside the agency or whether you must use contractors. This information should be documented in the—
- a. Make-or-buy decisions in the procurement management plan
 - b. Contracts management plan
 - c. Staffing management plan
 - d. Resource management plan
18. In both the weak and strong matrix organizational structures, the primary condition leading to conflict is—
- a. Communication barriers
 - b. Conflicting interests
 - c. Need for consensus
 - d. Ambiguous jurisdictions

19. As project manager, you are primarily responsible for implementing the project management plan by authorizing the execution of project activities. Because you do not work in a projectized organization, you do not have direct access to human resource administrative activities. Therefore you need to—
- Outsource these functions
 - Prepare a project team charter that is signed off by a member of the human resources department to delineate responsibilities
 - Ensure that your team is sufficiently aware of administrative requirements to ensure compliance
 - Ask the head of human resources to approve your project human resource plan personally
20. Constant bickering, absenteeism, and substandard performance have characterized the behavior of certain members of your team. You have planned an off-site retreat for the team to engage in a variety of activities. Your primary objective for investing time and money in this event is to improve—
- Team performance
 - Morale
 - Quality
 - Individual performance
21. Two team members on your project often disagree. You need a conflict resolution method that provides a long-term resolution. You decide to use which one of the following approaches?
- Confronting
 - Problem solving
 - Collaborating
 - Smoothing

22. Which of the following is an enterprise environmental factor that may influence the development of the human resource management plan?
- a. The organizational structure of the performing organization
 - b. Poor communication among team members
 - c. Ambiguous staffing requirements
 - d. Team morale
23. As a project manager, you believe in using a “personal touch” to further team development. One approach that has proven effective toward this goal is—
- a. Creating a team name
 - b. Providing flexible work time
 - c. Issuing a project charter
 - d. Celebrating special occasions
24. Your project has been under way for some time, but indicators show that it is in trouble. You have observed all the following symptoms of poor teamwork in your project team EXCEPT—
- a. Frustration
 - b. Excessive meetings
 - c. Lack of trust or confidence in the project manager
 - d. Unproductive meetings

25. You are the project manager for a two-year project that is now beginning its second year. The mix of team members has changed, and there is confusion as to roles and responsibilities. In addition, several of the completed work packages have not received the required sign-offs, and three work packages are five weeks behind schedule. To gain control of this project, you need to—
- a. Rebaseline your original human resource plan with current resource requirements
 - b. Change to a projectized organizational structure for maximum control over resource assignments
 - c. Work with your team to prepare a responsibility assignment matrix
 - d. Create a new division of labor by assigning technical leads to the most critical activities
26. You are part of a team that is working to develop a new medical implant device. Your project manager is an expert in medical implantation devices, yet he continually seeks opinions from the team about a wide variety of project and product issues. Team members often run project meetings while he sits silently at the head of the table. Which one of the following best characterizes his leadership style?
- a. Laissez-faire
 - b. Team directed
 - c. Collaborative
 - d. Shared leadership

27. The major difference between the project coordinator and project expeditor forms of organization is that—
- Strong commitment to the project usually does not exist in the project expeditor form of organization
 - The project coordinator cannot personally make or enforce decisions
 - The project expeditor acts only as an intermediary between management and the project team
 - The project coordinator reports to a higher-level manager in the organization
28. Which one of the following represents a constraint on the acquire project team process?
- Preassignment of staff to the project
 - Recruitment practices of the organizations involved
 - Use of outsourcing
 - Team member training requirements
29. According to Herzberg's Motivator-Hygiene Theory, when achievement, recognition, responsibility, and advancement, or promotion, are not present, employees will—
- Become alienated with the organization and leave
 - Lack motivation but will not be dissatisfied with their work
 - Lack motivation and become dissatisfied with their work
 - Become dissatisfied only if they do not receive salary increases
30. Objectives for conducting performance appraisals during the course of a project can include all the following EXCEPT—
- Initial establishment of roles and responsibilities
 - Discovery of unknown and unresolved issues
 - Development of individual training plans
 - Establishment of goals for future time periods

31. Your organization is adopting a project-based approach to business, which has been difficult. Although project teams have been created, they are little more than a collection of functional and technical experts who focus on their specialties. You are managing the company's most important project. As you begin this project, you must place a high priority on—
- a. Creating an effective team
 - b. Identifying the resources needed to finish the project on time
 - c. The best way to communicate status to the CEO
 - d. Establishing firm project requirements
32. In organizing a project, a project manager must deal with conflict. Which statement is TRUE regarding conflict in projects?
- a. A matrix form of organization can produce a lack of clear role definitions and lead to ambiguous jurisdictions between and among functional leaders and project managers
 - b. Sources of conflict include project priorities, PERT/CPM schedules, contract administrative procedures, and type of contract
 - c. Conflict is to be avoided whenever possible
 - d. Strong matrix project managers have few human resource conflicts, because they can dictate their needs to functional managers
33. The chances for successful completion of a multidisciplinary project are increased if project team members are—
- a. Problem oriented
 - b. Politically sensitive to top management's needs
 - c. Focused on individual project activities
 - d. Focused on customer demands

34. The terms strong matrix, balanced matrix, and weak matrix when applied to the matrix structure in project organization refer to the—
- a. Ability of the organization to achieve its goals
 - b. Physical proximity of project team members to one another and to the project manager
 - c. Degree of the project manager's authority
 - d. Degree to which team members bond together
35. The key way for a project manager to promote optimum team performance in project teams whose members are not collocated is to—
- a. Build trust
 - b. Establish a reward and recognition system
 - c. Obtain the support of the functional managers in the other locations
 - d. Exercise his or her right to control all aspects of the project
36. Hierarchical-type charts are a tool and technique for use in human resource planning. Which one of the following is helpful in tracking project costs and can be aligned with the organization's accounting system?
- a. RACI
 - b. RAM
 - c. RBS
 - d. OBS

37. When choosing the most appropriate form of project organization, the first step is to—
- a. Create the WBS and let it determine the project organizational structure
 - b. Produce a project management plan and determine the functional areas responsible for each task
 - c. Refer to the project charter developed by top management
 - d. Develop a project schedule, including a top-down flowchart, and identify the functional areas to perform each task
38. Conflicts in which following three areas represent the majority of all project conflicts?
- a. Personalities, cost objectives, and schedules
 - b. Cost objectives, administrative procedures, and scarce resources
 - c. Scarce resources, scheduling priorities, and personal work styles
 - d. Personal work styles, project priorities, and cost objectives
39. Which of the following qualifications is the most important for a project manager?
- a. Supervisory experience
 - b. Negotiation skill
 - c. Education in a technical field
 - d. Ability to work well with others
40. Determining the method and the timing of releasing team members should be included in the—
- a. Staff acquisition plan
 - b. Human resource plan
 - c. Staffing management plan
 - d. Project training plan

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
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31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. b. Projectized

In a projectized organizational structure, all project team members report directly and solely to the project manager. He or she has complete control over these resources and, therefore, exercises more authority over them than when in any other project organizational structure. [Planning]

PMI®, *PMBOK® Guide*, 2013, 25

2. c. Start early

Starting the team-building process early in the project is crucial for setting the right tone and preventing bad habits and patterns from developing. [Executing]

Adams et al. 1997, 137

PMI®, *PMBOK® Guide*, 2013, 514

3. d. In this strong matrix, the balance of power is shifted to the project manager.

The project manager's ability to influence project decisions increases the higher up he or she—and the person to whom he or she reports—is placed in the organization. In the strong matrix, the project manager's authority ranges from moderate to high. [Planning]

PMI®, *PMBOK® Guide*, 2013, 22

Verma 1995, 156–157

4. b. Make the link between project performance and reward clear, explicit, and achievable

Reward and recognition systems are formal management actions that provide an incentive to behave in a particular way, usually with respect to achieving certain goals. Such systems are described in the staffing management plan. A best practice is to give the team recognition throughout the life cycle [Executing] PMI®, *PMBOK® Guide*, 2013, 266 and 277

5. d. Collocation

Collocation is the placement of team members in the same physical location to enhance their ability to perform as a team, primarily through increased communication as well as improved working relationships and productivity. [Executing]

PMI®, *PMBOK® Guide*, 2013, 277, 532

6. c. Enhance communications planning

Because the dispersed project team does not share the same physical space each day, the possibility for misunderstandings, isolationism, difficulty in sharing information, and the cost of technology can be key issues. The project manager must enhance communications planning in the virtual team as it requires even more communication than collocated teams. Additional time also may be needed to set expectations, determine how best to resolve conflicts, involve people in making decisions, understand cultural differences, and share credit for success.[Executing]

Kostner 1994, 53–54 and 170

PMI®, *PMBOK® Guide*, 2013, 271

7. b. Conflicts over the relative priorities of different projects in competition for limited resources

When a finite group of resources must be distributed across multiple projects, conflicts in work assignments will occur. [Executing]

PMI®, *PMBOK® Guide*, 2013, 282–283, 518

8. d. Hold a project kickoff meeting

An indispensable tool in project management, the kickoff or launch meeting is held at the outset of the project and is designed to get the project rolling. The meeting provides the opportunity not only to present the project charter and discuss the project's goals and objectives but also to establish rapport among team members. [Executing]

Kerzner, 2009, 421–422

Meredith and Mantel, 2012, 224–225

9. b. McGregor's Theory X

McGregor observed two types of managers and classified them by their perceptions of workers. Theory X managers thought that workers were lazy, needed to be watched and supervised closely, and were irresponsible. Theory Y managers thought that, given the correct conditions, workers could be trusted to seek responsibility and work hard at their jobs. [Executing]

McGregor 1960, 33–35

Verma 1996, 70–71

PMI®, *PMBOK® Guide*, 2013, 263

10. a. Roles and responsibilities section

Roles and responsibilities are listed in the human resource plan. This section describes roles and authority, responsibility, and competency or the skill and capacity required to complete project activities. When team members do not have the required competencies, project performance may be jeopardized and the project manager must have proactive responses to handle these situations. [Planning]

PMI®, *PMBOK® Guide*, 2013, 264

11. a. Improved project performance

Improved project performance not only increases the likelihood of meeting project objectives, it also creates a positive team experience contributing to the enhancement of team capabilities. It results in improved teamwork, enhanced people skills and competencies, motivated employees, reduced staff turnover rates, and improved overall team performance. [Executing]

PMI®, *PMBOK® Guide*, 2013, 273

12. c. Establish a “team meeting room”

Collocating team members, even on a temporary basis, enhances communications, thereby contributing to improved project performance. In addition, the “team meeting room” (often called a ‘war room’) provides a sense of identity to the project team and raises the visibility of the project within the organization. Creating a newsletter is simply applying another organizational process asset, which typically has proven ineffective. [Executing]

PMI®, *PMBOK® Guide*, 2013, 277

13. b. Acquire project team

The project team directory is part of project staff assignments, an output from the acquire project team process. Other outputs are resource calendars and updates to the project management plan. [Executing]
PMI®, *PMBOK® Guide*, 2013, 272

14. d. Developing a vision and strategy, and motivating people to achieve them

Leadership involves developing a vision of the future and strategies to achieve that vision, positioning people to carry out the vision, and helping people energize themselves to overcome any barriers to change. [Executing]

PMI®, *PMBOK® Guide*, 2013, 284, 513–514

15. a. Referent

Referent power is based on a less powerful person's identification with a more powerful person. This type of power is useful in terms of persuasion and helps the project manager exert influence over individuals from whom he or she needs support. [Planning]

Adams et al., 1997, 174–180

Levin, 2010, 162–163

16. a. Roles and responsibilities section

Authority refers to the right to apply project resources, make decisions, and sign approvals. Examples include selecting methods to complete activities, quality acceptance, and responding to variances in the project. The individual authority of each team member should match their individual responsibilities. This is documented in the roles and responsibilities section in the human resource management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 264

17. c. Staffing management plan

The staffing management plan is part of the human resource management plan. One section of it involves staff acquisition. Among other things, this section includes whether the human resources will come from within the organization or from external, contracted sources. These data then help to plan the acquisition of project team members. [Planning]

PMI®, *PMBOK® Guide*, 2013, 265

18. d. Ambiguous jurisdictions

Ambiguous jurisdictions exist when two or more parties have related responsibilities, but their work boundaries and role definitions are unclear. This situation is found frequently in weak and strong matrix organizations because of the “two-boss” concept. [Executing]

Filley 1975, 9

Meredith and Mantel, 2012, 148–151

PMI®, *PMBOK® Guide*, 2013, 23

19. c. Ensure that your team is sufficiently aware of administrative requirements to ensure compliance

A projectized work environment is unusual because project managers rarely have every function under their control. But compliance with administrative requirements, government regulations, union contract provisions, and other constraints is a consideration in human resource management. [Planning]

PMI®, *PMBOK® Guide*, 2013, 22, 267

20. a. Team performance

Team development leads to improved team performance, which ultimately results in improved project performance. Improvements in team performance can come from many sources and can affect many areas of project performance. For example, improved individual skill levels such as enhanced technical competence may enable team members to perform their assigned activities more effectively. Team development efforts have greater benefit when conducted early but should take place throughout the project life cycle. [Executing]

PMI®, *PMBOK® Guide*, 2013, 274, 278

21. c. Collaborating

Collaborating or problem solving is an effective technique for managing conflict when a project is too important to be compromised. It involves incorporating multiple ideas and viewpoints from people with different perspectives and offers a good opportunity to learn from others. It provides a long-term resolution. [Executing]

PMI®, *PMBOK® Guide*, 2013, 283, 518

Verma 1996, 119–120

22. a. The organizational structure of the performing organization

Enterprise environmental factors can influence the develop human resource management plan process. The organizational structure of the performing organization determines whether the project manager's role is a strong one (as in a strong matrix) or a weak one (as in a weak matrix). Other examples of enterprise environmental factors are the organization's culture, geographic dispersion of team members, existing human resources, personnel administration functions, and marketplace conditions. [Planning]

PMI®, *PMBOK® Guide*, 2013, 260

23. d. Celebrating special occasions

Project managers can show interest in their team members by celebrating occasions such as birthdays, anniversaries with the organization, and special achievements. Other approaches include being supportive, being clear, learning some information about each team member, and being accessible. Through observation and conversation, the project management team monitors indicators such as progress toward project deliverables, accomplishments that are a source of pride for team members, and interpersonal issues. [Executing]

PMI®, *PMBOK® Guide*, 2013, 277, 282, 514

24. b. Excessive meetings

The problem is not too many meetings, but unproductive ones. The purpose of project meetings is to focus the skills and resources of the project team on project performance. Meetings that are considered “gripe sessions” or a time for the project manager to “lay down the law” are demoralizing to the team. [Executing]

Adams et al. 1997, 131

Meredith and Mantel, 2012, 448–449

25. c. Work with your team to prepare a responsibility assignment matrix

The responsibility assignment matrix defines project roles and responsibilities in terms of work packages and activities. It can be used to show who is a participant, who is accountable, who handles review, who provides input, and who must sign off on specific work packages or project phases. [Planning]

PMI®, *PMBOK® Guide*, 2013, 262

26. d. Shared leadership

Shared leadership is more than participatory management or collaboration; it involves letting the project team take over as much of the leadership role as it will accept. [Executing]

Verma 1997, 159

Kerzner, 2009, 224

PMI®, *PMBOK® Guide*, 2013, 294, 513–514

27. d. The project coordinator reports to a higher-level manager in the organization

The relative position of the project coordinator in the organization is thought to lead to an increased level of authority and responsibility. [Executing]

Adams et al. 1997, 15–17

Verma 1995, 153–156

PMI®, *PMBOK® Guide*, 2013, 23

28. b. Recruitment practices of the organizations involved

Staff assignments in organizations are governed by the policies, procedures, or guidelines of individual components. These policies will constrain the project manager's actions in acquiring a project team. The more familiar the project manager is with such policies, the easier it will be for him/her to assemble a team. Such recruitment practices are examples of personnel administration policies; an enterprise environmental factor, which is an input to acquire project team. [Executing]

PMI®, *PMBOK® Guide*, 2013, 268

29. c. Lack motivation and become dissatisfied with their work

Herzberg advanced the theory that hygiene factors, such as the poor attitude of a supervisor, lead to dissatisfaction but not usually to decreased motivation. When motivators, such as responsibility and recognition, are lacking, they lead to job dissatisfaction, but when such motivators are present, they tend to motivate a person in the performance of his or her work. [Executing]

Verma 1996, 64–65

Kerzner, 2009, 196

PMI®, *PMBOK® Guide*, 2013, 263

30. a. Initial establishment of roles and responsibilities

Project performance appraisals are a tool and technique for the manage project team process and are used, among other objectives, to reclarify roles and responsibilities. It is critical that team members receive positive feedback in what might otherwise be a hectic environment. [Executing]

PMI®, *PMBOK® Guide*, 2013, 282

31. a. Creating an effective team

An effective team is critical to project success, but such a team is not born spontaneously. In early project phases, it is vitally important for the project manager to place a high priority on initiating and implementing the team-building process. [Executing]

PMI®, *PMBOK® Guide*, 2013, 273–274

Verma 1997, 137

32. a. A matrix form of organization can produce a lack of clear role definitions and lead to ambiguous jurisdictions between and among functional leaders and project managers

Matrix management is useful but complex, involving difficult communication because of the use of borrowed and often part-time resources who are spread throughout the organization. [Executing]

Adams et al. 1997, 189–194

PMBOK® Guide, 2013, 22–23

33. a. Problem oriented

Problem-oriented people tend to learn and use whatever problem-solving techniques appear helpful. Although the project manager must be politically sensitive, team members need not have developed this skill to the extent required of the project manager; and rather than focusing on individual activities, team members should take a systems approach focusing on the entire project. [Executing]

Meredith and Mantel 2012, 102–103

34. c. Degree of the project manager's authority

In a strong matrix organization, the balance of power shifts toward the project manager. In a weak matrix organization, the balance of power shifts toward the functional or line manager. [Planning]

PMI®, *PMBOK® Guide*, 2013, 22

35. a. Build trust

Team members who are physically separate from one another tend not to know each other well. They have few opportunities to develop trust in the traditional way, and they tend to communicate poorly with one another. Trust then must become the foundation upon which all team-building activities are built.

[Executing]

PMI®, *PMBOK® Guide*, 2013, 271, 517–518

36. c. RBS

The resource breakdown structure (RBS) is a variation of the organizational breakdown structure (OBS) and is used to show which work elements are assigned to individuals and other resource categories. As an example, it can show all crane operators and cranes even though they may be scattered throughout the OBS and WBS, which can help to track project costs. [Planning]

PMI®, *PMBOK® Guide*, 2013, 261

37. b. Produce a project management plan and determine the functional areas responsible for each task

All effort on a project starts from the project management plan, which details the work that must be accomplished. It is a key input as the human resource management plan is developed [Planning]

Meredith and Mantel 2012, 221–224

PMI®, *PMBOK® Guide*, 2013, 259

38. c. Scarce resources, scheduling priorities, and personal work styles

Although all areas listed contain potential conflicts, the majority of all conflict in a project environment is caused by scarce resources, scheduling priorities, and personal work styles. [Executing]

PMI®, *PMBOK® Guide*, 2013, 282

39. d. Ability to work well with others

Project management requires getting things done through people who generally do not report directly to the project manager. The ability to influence project team members, as well as other key stakeholders, is crucial for success. [Executing]

PMI®, *PMBOK® Guide*, 2013, 16–17, 513

40. c. Staffing management plan

The staffing management plan is a document that describes when and how human resources will become part of the project team and when they will return to their organizational units. It addresses how staff members will be acquired, how long they will remain on the project, how and when they will be released, training needs, and other important aspects of forming and disbanding the team. [Planning]

PMI®, *PMBOK® Guide*, 2013, 265–266

Project Communications Management

Study Hints

The Project Communications Management questions on the PMP® certification exam are relatively basic and are taken primarily from the *PMBOK® Guide* and other PMI®-published reference materials. Common sense and your own experience will play a large role in your ability to answer the questions on this topic. There will be questions that test your specific knowledge of *PMBOK® Guide* terms and concepts. However, there will also be many general questions that require you to choose the “best” answer. To answer these questions correctly, you must apply common sense.

The questions focus on formal and informal communication, verbal versus written communication, performance reporting, and management styles. PMI® considers management style to be an essential component of how a project manager communicates.

The PMI® handbooks (which are now included in *Principles of Project Management*, PMI®, 1997), *Roles and Responsibilities of the Project Manager* by John R. Adams and Brian W. Campbell, *Conflict Management for Project*

Managers by John R. Adams and Nicki S. Kirchof, and *Team Building for Project Managers* by Linn C. Stuckenbruck and David Marshall, should be studied thoroughly for this section of the PMP® certification exam. Also review Appendix X3 in the *PMBOK® Guide*.

The PMI® publication *Human Resource Skills for the Project Manager*, which is volume 2 of *The Human Aspects of Project Management* by Vijay K. Verma, is another useful reference. PMI® considers the kickoff meeting one of the most effective mechanisms in Project Communications Management. The nature and purpose of this meeting are discussed in *Team Building for Project Managers*.

PMI® views Project Communications Management as a process consisting of three elements: plan communications management, manage communications, and control communications. See *PMBOK® Guide* Figure 10-1 for an overview of this structure. Know this chart thoroughly.

Following is a list of the major Project Communications Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Importance of project communications management

Communication dimensions

Communication channels

Communication skills

Plan communications

- The communications model
- Encode
- Transmit message
- Decode
- Acknowledge
- Feedback/Response
- Communications requirements analysis
- Communications technology
- Communication methods
- Meetings
- Communications management plan

Manage communications

- Sender-feedback model
- Choice of media
- Writing style
- Meeting management techniques
- Presentation techniques
- Facilitation techniques
- Listening techniques
- Information management systems
- Performance reporting
- Simple
- Elaborate
- Project communications

Barriers to communication

Control communications

- Issue log
- Meetings
- Work performance information
- Change requests

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. As project manager, you plan to conduct a “kickoff” meeting at which you will discuss all the following EXCEPT—
 - a. Establishing working relationships and standard formats for global communication
 - b. Reviewing project plans
 - c. Establishing individual and group responsibilities and accountabilities
 - d. Discussing specific legal issues regarding the contract
2. One purpose of the communications management plan is to provide information about the—
 - a. Methods that will be used to convey information
 - b. Methods that will be used for releasing team members from the project when they are no longer needed
 - c. Project organization and stakeholder responsibility relationships
 - d. Experience and skill levels of each team member
3. Project managers for international projects should recognize key issues in cross-cultural settings and place special emphasis on—
 - a. Establishing a performance reporting system
 - b. Using good communication planning
 - c. Establishing and following a production schedule for information distribution to avoid responding to requests for information between scheduled communications
 - d. Using translation services for formal, written project reports

4. You are managing a project with team members located at customer sites on three different continents. As you plan communications with your stakeholders, you should review—
 - a. Stakeholder management plan
 - b. Stakeholder register
 - c. Communications model
 - d. Communications channels
5. Having worked previously on projects as a team member, you are pleased to now be the project manager to develop a new process to ensure that software projects in your IT Department are considered a success and are not late or over budget. However, many of your team members are new to the organization. As you work to establish a high-performing team, you realize the importance of—
 - a. Mentoring
 - b. Coaching
 - c. Moving quickly through the forming and storming stages
 - d. Safeguarding information
6. As a project manager, you try to use empathic listening skills to help understand another person's frame of reference. In following this approach, you should—
 - a. Mimic the content of the message
 - b. Probe, then evaluate the content
 - c. Evaluate the content, then advise
 - d. Rephrase the content and reflect the feeling

7. Statements of organizational policies and philosophies, position descriptions, and constraints are examples of—
 - a. Formal communication
 - b. Lateral communication
 - c. External communication
 - d. Horizontal communication

8. You have decided to organize a study group of other project managers in your organization to help prepare for the PMP® exam. What type of communication activity are you employing in your efforts to organize this group?
 - a. Horizontal
 - b. Vertical
 - c. Official
 - d. External

9. Your company CEO just sent you an e-mail asking you to make a presentation on your project, which has been in progress for 18 months, to over 50 identified internal and external stakeholders. You have been conducting such presentations and holding meetings regularly on this important project. You should begin by—
 - a. Defining the audience
 - b. Determining the objective
 - c. Deciding on the general form of the presentation
 - d. Circulating issues to be discussed

10. You are responsible for a project in your organization that has multiple internal customers. Because many people in your organization are interested in this project, you realize the importance of—
 - a. Conducting a stakeholder analysis to assess information needs
 - b. Performing communications planning early
 - c. Determining the communications requirements of the customers
 - d. Having an expert on communications management and customer relationship management on your team
11. Project managers spend a great deal of time communicating with the team, the stakeholders, the client, and the sponsor. One can easily see the challenges involved, especially if one team member must communicate a technical concept to another team member in a different country. The first step in this process is to—
 - a. Encode the message
 - b. Decode the message
 - c. Determine the feedback loops
 - d. Determine the medium
12. On your project, scope changes, constraints, assumptions, integration and interface requirements, and overlapping roles and responsibilities pose communications challenges. The presence of communication barriers is most likely to lead to—
 - a. Reduced productivity
 - b. Increased hostility
 - c. Low morale
 - d. Increased conflict

13. The most common communication problem that occurs during negotiation is that—
 - a. Each side may misinterpret what the other side has said
 - b. Each side may give up on the other side
 - c. One side may try to confuse the other side
 - d. One side may be too busy thinking about what to say next to hear what is being said
14. You finally have been appointed project manager for a major company project. One of your first activities as project manager will be to create the communications management plan. As you match the stakeholder with the appropriate communication methods for that stakeholder, you could use any one of the following methods EXCEPT—
 - a. Interactive communications
 - b. Passive communications
 - c. Pull communications
 - d. Push communications
15. As an output of plan communications, it may be necessary to update the project documents, which include the—
 - a. Stakeholder register
 - b. Corporate policies, procedures, and processes
 - c. Knowledge management system
 - d. Stakeholder management plan
16. Sample attributes of a communications management plan include which one of the following?
 - a. Roles
 - b. Responsibilities
 - c. Ethics
 - d. Authority

17. The process of conferring with others to come to terms or reach an agreement is called—
- a. Win-win
 - b. Negotiation
 - c. Getting to “yes”
 - d. Confrontation
18. The key benefit of the control communications process is to—
- a. Sharing best practices with other project teams in the organization with lessons learned
 - b. Ensuring the information needs of stakeholders are met
 - c. Ensuring an optimal information flow among communication participants
 - d. Providing stakeholders with information about resolved issues, approved status, and project status
19. The issue log is useful in control communications because it—
- a. Provides what has happened and is a platform for subsequent communications
 - b. Includes the project’s risk register
 - c. Organizes and summarizes information gathered
 - d. Serves as an information management system for communications management

20. As head of the PMO, you will receive performance reports for all major projects. You decided to set a guideline for project managers as performance reporting should—
- a. Collect work performance information on the status of deliverables
 - b. Provide earned value data for project forecasting
 - c. Provide information at an appropriate level for each audience
 - d. Focus on cost and schedule variances rather than scope, resources, quality, and risks
21. A simple performance report provides information on—
- a. Percent complete
 - b. Customer satisfaction
 - c. Unacceptable variances
 - d. Scope creep
22. Communication is important when setting and managing expectations with the stakeholders. Which one of the following statements is NOT true regarding the importance of communications within a project?
- a. Communications is one of the single biggest contributors to project success or failure.
 - b. Project resources should be spent primarily on communicating information that leads to project success.
 - c. Effective communications includes awareness of communication styles, cultural issues, relationships, personalities, and the context of the situation
 - d. Listening is part of communicating and is a way to gain insight into problem areas, managing conflicts, and making decisions.

23. In person-to-person communication, messages are sent on verbal levels and nonverbal levels simultaneously. As a general rule, what percentage of the message actually is sent through nonverbal cues?
 - a. 5 percent to 15 percent
 - b. 20 percent to 30 percent
 - c. 40 percent to 50 percent
 - d. Greater than 50 percent
24. As an output from control communications, it may be necessary to update the—
 - a. Project schedule
 - b. Forecasts
 - c. Corporate policies, procedures, and processes
 - d. Knowledge management system
25. In project communications, the first step in a written communication is to—
 - a. Analyze the facts and assumptions that have a bearing on the purpose of the message
 - b. Gather thoughts or ideas
 - c. Develop a logical sequence of the topics to be addressed
 - d. Establish the basic purpose of the message
26. A communications management plan includes which one of the following sample contents?
 - a. Issues
 - b. Escalation processes, including time frames and the management chains
 - c. Dimensions
 - d. Project assumptions and constraints

27. Your organization has decided to use project management for all of its endeavors. It has established a Center of Excellence for Project Management to support the movement into management by projects and has appointed you as its director. Since you work in a matrix environment, which of the following types of communications is the most essential for success?
- a. Upward
 - b. Horizontal
 - c. Downward
 - d. Diagonal
28. You have heard recently that the client calls your progress reports the “Code of Hammurabi” because they seem to be written in hieroglyphics and are completely indecipherable to all but an antiquities scholar. This situation could have been avoided by—
- a. Informing the client at the start of the project about the types of reports they will receive
 - b. Using risk management techniques to identify client issues
 - c. Hiring an expert report writer to prepare standard reports
 - d. Engaging in communications planning
29. Assume on your project you have identified 250 stakeholders located in three continents and of these 250, you have determined that 200 of them will be actively involved and interested in your project. Therefore, as you determine an appropriate communication method, your best approach is—
- a. Elaborate status reports
 - b. Simple status reports
 - c. Knowledge repositories
 - d. E-mails

30. You want to ensure that the information you collect showing project progress and status is meaningful to stakeholders. You want to combine the type and format of the stakeholder's information needs with an analysis of the value of the information. You will document this information in the—
- a. Communications register
 - b. Stakeholder register
 - c. Stakeholder management plan
 - d. Communications management plan
31. Work performance information is an output of which process?
- a. Manage risks
 - b. Manage communications
 - c. Control communications
 - d. Report performance
32. Assume you want to optimize the work performance reports you will use to manage communications. You should do so by—
- a. Determining the most appropriate choice of communications media
 - b. Setting different communications techniques for different stakeholder groups
 - c. Ensuring the information is consistent with regulations and standards
 - d. Ensuring comprehensiveness, accuracy, and availability

33. Information received from stakeholders concerning project operations can be distributed and used to modify or improve future performance of the project. This modification or improvement is done as an update to organizational process assets during which following process?
 - a. Plan communications management
 - b. Distribute information
 - c. Manage communications
 - d. Report performance
34. General management skills relevant to the manage communications process include—
 - a. Operational planning
 - b. Organizational behavior
 - c. Setting and managing expectations
 - d. Influencing the organization
35. Changes in the report formats and lessons learned documents process should trigger changes to the—
 - a. Project management plan and performance reporting system
 - b. Integrated change control system and the communications management plan
 - c. Monitor and control project process and the project management plan
 - d. Organizational process assets updates
36. One way to determine how to best update and communicate project performance and respond to stakeholder information requests is to—
 - a. Review the effectiveness of the communications management plan
 - b. Set up a portal
 - c. Hold meetings
 - d. Distribute performance reports

37. The purpose of work performance data in control communications is to present results of comparative analysis to the—
 - a. Performance measurement baseline
 - b. Communications management plan
 - c. Stakeholder management plan
 - d. Deliverable status
38. Because communications planning often is linked tightly with enterprise environmental factors, which one of the following statements is true?
 - a. The project's organizational structure has a major effect on the project's communications requirements.
 - b. Standardized guidelines, work instructions, and performance measurement criteria are key items to consider.
 - c. Procedures for approving and issuing work authorizations should be taken into consideration.
 - d. Criteria and guidelines to tailor standard processes to the specific needs of the project should be stated explicitly.
39. You are working on a project with 15 stakeholders. The number of communication channels on this project is—
 - a. 15
 - b. 105
 - c. 210
 - d. 225

40. Which of the following formulas calculates the number of communication channels in a project?

a. $\frac{n(n-1)}{2}$

b. $\frac{n^2-1}{2}$

c. $\frac{n^2-1}{n}$

d. $\frac{2^n-2}{1^n}$

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d

21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. d. Discussing specific legal issues regarding the contract

Conducted after contract award or approval of the project, the kickoff meeting provides an opportunity for project participants to get to know each other and review information about the project. It is not a forum to discuss detailed project issues. [Planning]

Meredith and Mantel, 2012, 224–225

Kerzner, 200, 421–423

2. a. Methods that will be used to convey information

These methods or technologies can include memos, e-mails, and/or press conferences. They are one of several items to include in this plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 296

3. b. Using good communications planning

An effective way to manage cultural diversity on projects is for the project manager to get to know the team members and to use good communication planning. It is necessary to consider time zones and language barriers as well as cultural differences and to include a glossary of common terminology in the communications management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 290, 296, and 516

4. b. Stakeholder register

The stakeholder register is an input to the plan communications management process. It contains the identified stakeholders including their name, position, location, and role; their main requirements, expectations, and potential influence; and whether or not they are supporters, neutral, or resistors of the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 291, 398

5. b. Coaching

Many communications skills are common to both general management and project management. Coaching is one example. It is especially useful to develop the team to higher levels of competency and performance and helping people recognize their potential through empowerment and development. It is used to aid team members to develop or enhance their skills required to achieve project success. [Planning and Executing]

PMI®, *PMBOK® Guide*, 2013, 288, 519

6. d. Rephrase the content and reflect the feeling

Empathic listening requires seeing the world the way the other person sees it, with the goal of understanding that person's views and feelings. Unlike sympathetic listening, empathic listening contains no element of value judgment. It is essential to listen actively and effectively and to question and probe ideas to help ensure better understanding. [Executing]

Covey 2004, 239–243

PMI®, *PMBOK® Guide*, 2013, 288, 515

7. a. Formal communication

Formal communication provides direction and control for project team members and other employees. They also contain reports, minutes, and briefings and are examples of organizational process assets used in manage communications and in control communications. [Executing and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 287, 300, 306

8. a. Horizontal

Communication activities have many potential dimensions to consider in exchanging information between the sender and the receiver. Horizontal communication occurs between or among peers, that is, across, rather than up and down, the organization. [Executing]

PMI®, *PMBOK® Guide*, 2013, 287

9. d. Circulating issues to be discussed

Meetings are held regularly on projects to update and communicate project information and to respond to requests from stakeholders for the information. Most meetings consist of stakeholders coming together to resolve problems or make decisions. Typical meetings begin with a defined list of issues to be discussed, which are distributed in advance with minutes and other key information relative to the meeting. [Planning]

PMI®, *PMBOK® Guide*, 2013, 295

10. b. Performing communications planning early

On most projects, communications planning should be performed very early such as when the project management plan is prepared. This approach then allows appropriate resources, such as time and budget, to be allocated to communications activities. [Planning]

PMI®, *PMBOK® Guide*, 2013, 290

11. a. Encode the message

As the first step in the basic communication model, it is essential to translate thoughts or ideas into a language that is understood by others. Then, the message is sent using various technologies, and the receiver decodes it or translates it back into meaningful thoughts or ideas. [Planning]

PMI®, *PMBOK® Guide*, 2013, 293–294

12. d. Increased conflict

Barriers to communication lead to a poor flow of information. Accordingly, messages are misinterpreted by recipients, thereby creating different perceptions, understanding, and frames of reference. Left unchecked, poor communication increases conflict among project stakeholders, which causes the other problems listed to arise. Then, the project manager must work actively to resolve conflicts so disruptive impacts are prevented [Executing]

PMI®, *PMBOK® Guide*, 2013, 288

Verma 1997, 24–25

13. a. Each side may misinterpret what the other side has said

Effective communication is the key to successful negotiation. Misunderstanding is the most common communication problem. A project manager should listen actively, acknowledge what is being said, and speak for a purpose. It is essential to listen attentively and communicate articulately. [Executing]

PMI®, *PMBOK® Guide*, 2013, 517

Fisher et al. 1991, 32–34

Verma 1996, 165

14. b. Passive communications

You can use several different methods to share information. Interactive communications are multi-directional in nature, such as conferences and meetings. Pull communications are those methods where the recipient finds the information at their leisure and gets the information that they want at their discretion. Push communications is targeted information sent to a select group but does not certify that the recipient actually has received the information, such as e-mail. Passive communications is more of a style of delivering the content or receiving the content. [Planning]

PMI®, *PMBOK® Guide*, 2013, 295

15. a. Stakeholder register

In the plan communications management process the two documents that may be updated are the project schedule and the stakeholder register. [Planning]

PMI®, *PMBOK® Guide*, 2013, 297

16. b. Responsibilities

The communications management plan should identify the person responsible for communicating the information and the person responsible for authorizing release of any confidential information. [Planning]

PMI®, *PMBOK® Guide*, 2013, 296

17. b. Negotiation

Negotiation if done well increases the probability of project success and involves conferring with others of shared or opposed interests with a view toward compromise. Negotiating is required to achieve mutually acceptable agreements between parties. [Executing]

PMI®, *PMBOK® Guide*, 2013, 288, 517

18. b. Ensuring optimal information flow among all communication participants

While control communications as a process monitors and controls communications throughout the project to ensure the communication needs of project stakeholders are met, the key benefit is to ensure an optimal information flow among all communication participants at any moment in time. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 303

19. a. Provides what has happened and is a platform for subsequent communications

The issue log is an input to control communications and is used to document and monitor issue resolution. It can facilitate communications and ensure a common understanding of issues. In this process its information provides a repository of what already has happened in the project and serves as a platform for subsequent communications to be delivered.
[Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 305

20. c. Provide information at an appropriate level for each audience

Performance reporting is a tool and technique in manage communications. Performance reports range from simple status reports to more elaborate reports. The emphasis is to ensure performance reporting provides the needed information for each audience level. [Executing]

PMI®, *PMBOK® Guide*, 2013, 301

21. a. Percent complete

A simple status report may show performance information such as percent complete or status information for each area (scope, schedule, cost, and quality).
[Executing]

PMI®, *PMBOK® Guide*, 2013, 301

22. b. Project resources should be spent primarily on communicating information that leads to project success

Communications is considered one of the single most powerful indicators of project success or failure. Effective communications includes an awareness of all types of filters that may be impeding or straining communications. Listening is vital to good communications. Resources also should be spent on determining where a lack of communications can lead to failure. [Planning]
PMI®, *PMBOK® Guide*, 2013, 289–291

23. d. Greater than 50 percent

Nonverbal cues can be divided into four categories: physical, aesthetic, signs, and symbols. Many studies have demonstrated that most messages are conveyed through such nonverbal cues as facial expression, touch, and body motion, rather than through the words spoken. [Executing]
Verma 1996, 19

24. b. Forecasts

Communications control often entails the need to update project documents, including forecasts, performance reports, and the issue log. [Monitoring and Controlling]
PMI®, *PMBOK® Guide*, 2013, 308

25. b. Gather thoughts or ideas

For any type of communication, the first step in the basic communication model is to encode, which means the sender translates thoughts or ideas into language [Planning]
PMI®, *PMBOK® Guide*, 2013, 293

26. b. Escalation processes, including time frames and the management chains

Numerous items, including escalation processes, are part of the communications management plan. Business issues may arise that cannot be resolved at a lower staff level. During such a time, an escalation process is required to show time frames and the names of people in the management chain who will work to resolve these issues. [Planning]

PMI®, *PMBOK® Guide*, 2013, 296

27. b. Horizontal

Horizontal communication is between the project manager and his or her peers and will be where most of the communications will occur. Accordingly, it is essential for success in a highly competitive environment and requires diplomacy, experience, and mutual respect. [Executing]

Verma 1997, 136

PMI®, *PMBOK® Guide*, 2013, 287

28. d. Engaging in communications planning

The communications management plan is prepared during plan communications management. The plan should include a description of the information to be distributed such as format, content, level of detail, as well as conventions and definitions to be used. [Planning]

PMI®, *PMBOK® Guide*, 2013, 296

29. c. Knowledge repositories

Knowledge repositories along with Intranet sites, e-learning, and lessons learned data bases are examples of methods of pull communications. They are used for large volumes of information or for large audiences and require recipients to access communication content at their own discretion. [Planning]

PMI®, *PMBOK® Guide*, 2013, 295

30. d. Communications management plan

The project team must conduct an analysis of stakeholder communications requirements to ensure that stakeholders are receiving the information required to participate in the project. For example, stakeholders typically require performance reports for information purposes. Such information requirements should be included in the communications management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 291 and 296

31. c. Control communications

Work performance information, an output of control communications, organizes and summarizes performance data such as status and progress information on the project at the level required by stakeholders. This information next is communicated to the appropriate stakeholders. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 307

32. d. Ensuring comprehensiveness, accuracy, and availability

Work performance reports are an input to manage communications. They are a collection of project performance and status information used to facilitate discussion and create communications. They should be comprehensive, accurate, and available in a timely way. [Executing]

PMI®, *PMBOK® Guide*, 2013, 299

33. c. Manage communications

Feedback from stakeholders is an example of an organizational process asset to update as a result of the manage communications process. [Executing]

PMI®, *PMBOK® Guide*, 2013, 303

34. c. Setting and managing expectations

Communications skills are part of general management skills, and setting and managing expectations are an example in manage communications. This helps create, collect, distribute, store, retrieve, and ultimately dispose of project information according to the communications management plan. [Executing]

PMI®, *PMBOK® Guide*, 2013, 287–288, 297

35. d. Organizational process assets updates

Any changes in report formats or lessons learned documentation are organizational process asset updates as an output of control communications. The documentation may become part of the historical data base for both the project and the organization. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 308

36. c. Hold meetings

Meetings are a tool and technique in control communications. They can be face to face or online and in different locations and may include not only the project team but also suppliers, vendors, and other stakeholders. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 307

37. a. Performance measurement baseline

Work performance data are an input in control communications. These data organize and summarize information gathered and present the results of comparative analysis to the performance measurement baseline. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 305

38. a. The project's organizational structure has a major effect on the project's communications requirements.

Enterprise environmental factors undoubtedly will influence the project's success and must be considered because communication must be adapted to the project environment. [Planning]

PMI®, *PMBOK® Guide*, 2013, 29, 291

39. b. 105

The formula for determining the number of communication channels is $n(n - 1)/2$, where n = the number of stakeholders: $15(15 - 1)/2 = (15)(14)/2 = 105$. It is important to note that project managers must plan the project's communications requirements carefully, limiting who will communicate with whom given the potential for confusion when multiple communications channels can exist. [Planning]

PMI®, *PMBOK® Guide*, 2013, 292

40. a. $\frac{n(n - 1)}{2}$

Where n = the number of stakeholders. [Planning]

PMI®, *PMBOK® Guide*, 2013, 292

Project Risk Management

Study Hints

Most exam takers find the Project Risk Management questions on the PMP® certification exam demanding because they address many concepts that project managers may not have been exposed to in their work or education. However, the questions correspond closely to *PMBOK® Guide* material, so you should not have much difficulty if you study the concepts and terminology found there. Although the questions included do not contain mathematically complex work problems, they do require you to know certain theories, such as expected monetary value (EMV) and decision-tree analysis. Additionally, you are likely to encounter questions related to levels of risk faced by both buyer and seller based on various types of contracts.

PMI® views risk management as a six-step process including plan risk management, identify risks, perform qualitative risk analysis, perform quantitative risk analysis, plan risk response, and control risk. *PMBOK® Guide* Figure 11-1 provides an overview of this approach. Know this chart thoroughly.

Following is a list of the major Project Risk Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Project risk management

- Risk defined
- Types of risk
- Known risks
- Unknown risks
- Organization's risk attitude
- Risk appetite
- Risk tolerance
- Risk threshold
- Risk factors
- Risk event
- Probability of occurrence
- Amount at stake (impact)
- Risk conditions
- Risk tolerances

Risk processes

Plan risk management

- Planning meetings and analyses
- Analytical techniques
- Risk management plan
- Methodology
- Roles and responsibilities
- Budget
- Timing
- Categories
- Definitions of probability and impact
- Probability and impact matrix
- Revised stakeholder tolerances
- Reporting formats
- Tracking

Identify risks

- Definition
- Timing
- Plans and baselines
- Project documents

Identify risks tools and techniques

- Documentation reviews
- Brainstorming
- Delphi method
- Interviews
- Root cause analysis
- Strengths-weaknesses-opportunities-threats (SWOT) analysis
- Influence diagrams
- Checklists
- Assumption analysis
- Diagramming techniques
- Expert judgment

Risk register

- List of identified risks
- List of potential responses

Perform qualitative risk analysis

- Prioritize risks for further action
- Risk probability and impact assessment
- Probability and impact matrix
- Risk data quality assessment
- Risk categories
- Risk urgency assessment
- Expert judgment

- Assumption log updates
- Risk register updates
- Relative ranking or priority list of risks
- Risks by category
- Causes of risks requiring particular attention
- Risks requiring near-term responses and additional analysis and responses
- Watch list of low priority risks

Perform quantitative risk analysis

- Numerical analysis of the effect of identified risks on project objectives
- Interviewing
- Probability distribution
- Sensitivity analysis
- Expected monetary value analysis
- Decision-tree analysis
- Monte Carlo analysis
- Path convergence
- Statistical distribution
- Risk register updates
- Probabilistic analysis of the project
- Probability of achieving cost and time objectives
- Prioritized list of quantified risks
- Trends

Plan risk responses

- Negative risks or threats
- Avoid
- Transfer
- Mitigate
- Accept
- Positive risks or opportunities
- Exploit

- Share
- Enhance
- Accept
- Contingent responses
- Risk register updates
- Risk-related contract decisions
- Updates to plans and documents

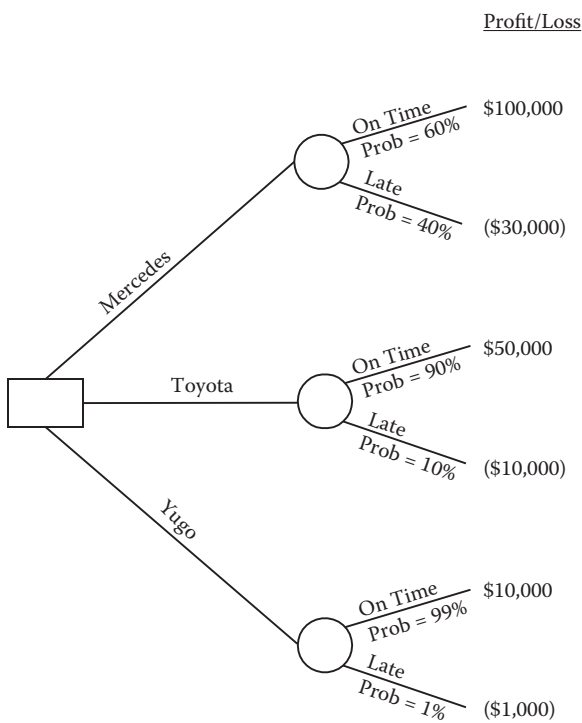
Control risks

- Definition and purpose
- Tools and techniques
- Risk reassessment
- Risk audits
- Variance and trend analysis
- Technical performance measurement
- Reserve analysis
- Status meetings
- Updates to the risk register
- Change requests
- Updates to organizational process assets, plans, and documents

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. As the project manager, you have the option of proposing one of three systems to a client: a full-feature system that not only satisfies the minimum requirements but also offers numerous special functions (the “Mercedes”); a system that meets the client’s minimum requirements (the “Yugo”); and a system that satisfies the minimum requirements plus has a few extra features (the “Toyota”). The on-time records and associated profits and losses are depicted on the below decision tree. What is the expected monetary value of the “Toyota” system?



- a. \$9,900
- b. \$44,000
- c. \$45,000
- d. \$48,000

2. A risk response strategy that can be used for both threats and opportunities is—
 - a. Share
 - b. Avoid
 - c. Accept
 - d. Transfer

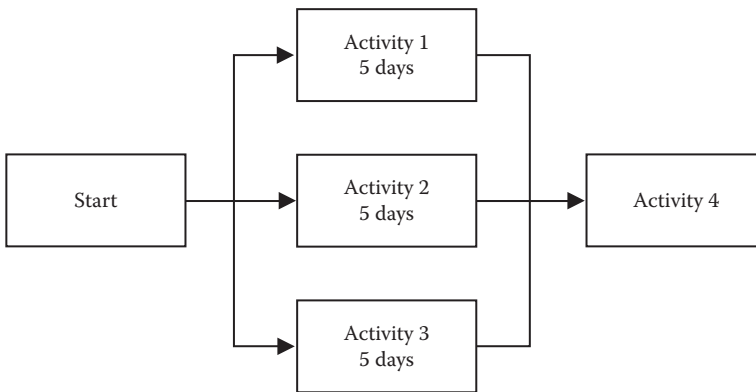
3. The risk urgency assessment is a tool and technique used for—
 - a. Plan risk responses
 - b. Identify risks
 - c. Perform qualitative risk analysis
 - d. Perform quantitative risk analysis

4. Projects are particularly susceptible to risk because—
 - a. Murphy's law states that "if something can go wrong, it will"
 - b. There is uncertainty in all projects
 - c. Project management tools are generally unavailable at the project team level
 - d. There are never enough resources to do the job

5. As project manager, you have assembled the team to prepare a comprehensive list of project risks. Which one of the following documents would be the most helpful in this process?
 - a. OBS
 - b. WBS
 - c. RBS
 - d. CBS

6. You are working on identifying possible risks to your project to develop a nutritional supplement. You want to develop a comprehensive list of risks that can be addressed later through qualitative and quantitative risk analysis. An information gathering technique used to identify risks is—
 - a. Documentation reviews
 - b. Probability and impact analysis
 - c. Checklist analysis
 - d. Brainstorming
7. The Delphi technique is a particularly useful method for identifying risks to—
 - a. Present a sequence of decision choices graphically to decision makers
 - b. Define the probability of occurrence of specific variables
 - c. Reduce bias in the analysis and keep any one person from having undue influence on the outcome
 - d. Help take into account the attitude of the decision maker toward risk
8. A workaround is—
 - a. An unplanned response to a negative risk event
 - b. A plan of action to follow when something unexpected occurs
 - c. A specific response to certain types of risk as described in the risk management plan
 - d. A proactive, planned method of responding to risks

9. Most statistical simulations of budgets, schedules, and resource allocations use which one of the following approaches?
- PERT
 - Decision-tree analysis
 - Present value analysis
 - Monte Carlo analysis
10. In the below path convergence example, if the odds of completing activities 1, 2, and 3 on time are 50 percent, 50 percent, and 50 percent, what are the chances of starting activity 4 on day 6?



- 10 percent
- 13 percent
- 40 percent
- 50 percent

11. A project health check identified a risk that your project would not be completed on time. As a result, you are quantifying the project's risk exposure and determining what cost and schedule contingency reserves might be needed. You performed a schedule risk analysis using Monte Carlo analysis. The basis for your schedule risk analysis is the—
- WBS
 - Gantt chart
 - Schedule network diagram and duration estimates
 - Probability/impact risk rating matrix
12. You are developing radio frequency (RF) technology that will improve overnight package delivery. You ask each stakeholder to estimate the most optimistic package delivery time using the RF technology, the most pessimistic time, and the most likely time. This shows that for your next step you plan to—
- Use a beta or triangular probability distribution
 - Conduct a sensitivity analysis
 - Structure a decision analysis as a decision tree
 - Determine the strategy for risk response
13. Each one of the following statements about risk avoidance is true EXCEPT that it—
- Focuses on changing the project management plan to eliminate entirely the threat
 - Isolates the project's objectives from the risk's impact
 - Accepts the consequences of the risk event should it occur
 - Changes the project objective that is in jeopardy

14. If the probability of event 1 is 80 percent and of event 2 is 70 percent and they are independent events, how likely is it that both events will occur?
 - a. 6 percent
 - b. 15 percent
 - c. 24 percent
 - d. 56 percent
15. The project scope statement should be used in the identify risk process because it—
 - a. Identifies project assumptions
 - b. Identifies all the work that must be done and, therefore, includes all the risks on the project
 - c. Helps to organize all the work that must be done on the project
 - d. Contains information on risks from prior projects
16. Your project team has identified all the risks on the project and has categorized them as high, medium, and low. The “low” risks are placed on which one of the following for monitoring?
 - a. Threat list
 - b. Low risk list
 - c. Watch list
 - d. Low impact list
17. A general contingency is used for—
 - a. Risks that are identified at the outset of the project
 - b. Risks that are not identified at the outset of the project but are known before they occur
 - c. Risks that cannot be known before they occur because they are external risks
 - d. Any risks that cannot be known before they occur

18. The simplest form of quantitative risk analysis and modeling techniques is—
 - a. Probability analysis
 - b. Sensitivity analysis
 - c. Delphi technique
 - d. Utility theory

19. If a business venture has a 60-percent chance to earn \$2 million and a 20-percent chance to lose \$1.5 million, what is the expected monetary value of the venture?
 - a. −\$50,000
 - b. \$300,000
 - c. \$500,000
 - d. \$900,000

20. You are managing the construction of a highly sophisticated data center in Port Moresby, Papua, New Guinea. Although this location offers significant economic advantages, the threat of typhoons has caused you to create a backup plan to operate in Manila in case the center is flooded. This plan is an example of what type of risk response?
 - a. Passive avoidance
 - b. Mitigation
 - c. Active acceptance
 - d. Deflection

21. A recent earned value analysis shows that your project is 20 percent complete, the CPI is 0.67, and the SPI is 0.87. In this situation, you should—
- Perform additional resource planning, add resources, and use overtime as needed to accomplish the same amount of budgeted work
 - Rebaseline the schedule, then use Monte Carlo analysis
 - Conduct a risk response audit to help control risk
 - Forecast potential deviation of the project at completion from cost and schedule targets
22. The purpose of a numeric scale in risk management is to—
- Avoid high-impact risks
 - Assign a relative value to the impact on project objectives if the risk in question occurs
 - Rank order risks in terms of very low, low, moderate, high, and very high
 - Test project assumptions
23. Risk score measures the—
- Variability of the estimate
 - Product of the probability and impact of the risk
 - Range of schedule and cost outcomes
 - Reduced monetary value of the risk event
24. Which of the following is an example of recommended corrective action in risk management?
- Conducting a risk audit
 - Engaging in additional risk response planning
 - Performing the contingency plan
 - Conducting a risk review

25. The primary advantage of using decision-tree analysis in project risk management is that it—
 - a. Considers the attitude of the decision maker toward risk
 - b. Forces consideration of the probability of each outcome
 - c. Helps to identify and postulate risk scenarios for the project
 - d. Shows how risks can occur in combination
26. Your project is using complex, unproven technology. Your team conducted a brainstorming session to identify risks. Poor allocation of project resources was the number one risk. This risk was placed on the risk register, which included at this point a—
 - a. Watch list
 - b. Potential risk response
 - c. Known unknown
 - d. List of other risks requiring additional analysis
27. When managing current projects, it is important to use lessons learned from previous projects to improve the organization's project management process. Therefore, in project closing procedures, it is important to review the—
 - a. Secondary risks that occurred
 - b. Checklists for identify risks
 - c. WBS dictionary
 - d. Fallback plan
28. Risk mitigation involves—
 - a. Using performance and payment bonds
 - b. Eliminating a specific threat by eliminating the cause
 - c. Avoiding the schedule risk inherent in the project
 - d. Reducing the probability and/or impact of an adverse risk event to an acceptable threshold

29. On a typical project, when are risks highest and impacts (amount at stake) lowest?
- a. During the concept phase
 - b. At or near completion of the project
 - c. During the implementation phase
 - d. When the project manager is replaced
30. Two key inputs to the perform quantitative risk analysis process are the—
- a. WBS and milestone list
 - b. Scope management plan and process improvement plan
 - c. Schedule management plan and cost management plan
 - d. Procurement management plan and quality baseline
31. The highest risk impact generally occurs during which one of the following project life-cycle phases?
- a. Concept and planning
 - b. Planning and implementation
 - c. Implementation and closeout
 - d. Concept and closeout
32. Which one of the following statements best characterizes an activity cost or duration estimate developed with a limited amount of information?
- a. It should be part of the planning for the needed management reserve.
 - b. It is an input to identify risks.
 - c. It is an output from identify risks.
 - d. It must be factored into the list of prioritized project risks.

33. What is the primary difference between a risk audit and a risk reassessment?
 - a. A risk reassessment is conducted at the completion of a major phase; audits are conducted after the project is complete.
 - b. Project stakeholders conduct risk audits; management conducts reassessments.
 - c. Risk reassessments are regularly scheduled; risk audits are performed as defined in the project's risk management plan.
 - d. There is no difference; they are virtually the same.
34. Accurate and unbiased data are essential for perform qualitative risk analysis. Which one of the following should you use to examine the extent of understanding of project risk?
 - a. Data quality assessment
 - b. Project assumptions testing
 - c. Sensitivity analysis
 - d. Influence diagrams
35. Assigning more talented resources to the project to reduce time to completion or to provide better quality than originally planned are examples of which one of the following strategies?
 - a. Enhance
 - b. Exploit
 - c. Share
 - d. Contingent response

36. Which of the following is NOT an objective of a risk audit?
- a. Confirming that risk management has been practiced throughout the project life cycle
 - b. Confirming that the project is well managed and that the risks are being controlled
 - c. Evaluating the effectiveness of risk responses in dealing with identified risks
 - d. Ensuring that each risk identified and deemed critical has a computed expected value
37. Contingency planning involves—
- a. Defining the steps to be taken if an identified risk event should occur
 - b. Establishing a management reserve to cover unplanned expenditures
 - c. Preparing a stand-alone document that is separate from the overall project plan
 - d. Determining needed adjustments to make during the implementation phase of a project
38. Assume that you are working on a new product for your firm. Your CEO learned that a competitor was about to launch a new product that has similar features to those of your project. The competitor plans to launch the product on September 1. It is now March 1. Your schedule called for you to launch your product on December 1. Your CEO now has now mandated that you fast track your project so you can launch your product on August 1. This fast track schedule is an example of an—
- a. Unknown risk
 - b. A risk taken to achieve a reward
 - c. A response that requires sharing the risk
 - d. A passive avoidance strategy

39. As head of the project management office, you need to focus on those items where risk responses can lead to better project outcomes. One way to help you make these decisions is to—
 - a. Use a probability and impact matrix
 - b. Assess trends in perform quantitative risk analysis results
 - c. Prioritize risks and conditions
 - d. Assess trends in perform qualitative risk analysis results

40. You are the project manager for the construction of an incinerator to burn refuse. Local residents and environmental groups are opposed to this project. Management agrees to move this project to a different location. This is an example of which one of the following risk responses?
 - a. Passive acceptance
 - b. Active acceptance
 - c. Mitigation
 - d. Avoidance

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d

21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. b. \$44,000

$$\begin{aligned}
 EMV_{\text{Toyota}} &= (\$50,000 \times 90\%) + (-\$10,000 \times 10\%) \\
 &= \$45,000 + (-\$1,000) \\
 &= \$44,000
 \end{aligned}$$

[Planning]

PMI®, *PMBOK® Guide*, 2013, 339

2. c. Accept

Risk exists on every project, and it is unrealistic to think it can be eliminated completely. There are certain risks that simply must be accepted because we cannot control whether or not they will occur (for example, an earthquake). Acceptance is a strategy for dealing with risk that can be used for both threats and opportunities. [Planning]

PMI®, *PMBOK® Guide*, 2013, 345–346

3. c. Perform qualitative risk analysis

Risks that may happen in the near-term need urgent attention. The purpose of the risk urgency assessment is to identify those risks that have a high likelihood of happening sooner rather than later. It is combined with the risk ranking to give a final risk severity ranking [Planning]

PMI®, *PMBOK® Guide*, 2013, 333

4. b. There is uncertainty in all projects

Every project has uncertainty associated with it because a project by its definition is a temporary endeavor undertaken to create a unique product, service, or result. Risks may be known or unknown. [Planning]

PMI®, *PMBOK® Guide*, 2013, 3 and 310

5. c. RBS

The risk breakdown structure (RBS) helps to provide framework for ensuring a comprehensive process of systematically identified risks. It is a hierarchically organized depiction of the identified risks by risk categories. [Planning]

PMI®, *PMBOK® Guide*, 2013, 317, 332

6. d. Brainstorming

Brainstorming is a frequently used information-gathering technique for identifying risk, because it enables the project team to develop a list of potential risks relatively quickly. Project team members, or invited experts, participate in the session. Risks are easily categorized for follow-on analysis. [Planning]

PMI®, *PMBOK® Guide*, 2013, 324

7. c. Reduce bias in the analysis and keep any one person from having undue influence on the outcome

The Delphi technique provides a means for arriving at a consensus using a panel of experts to determine a solution to a specific problem. Project risk experts are identified but participate anonymously. Each panelist answers a questionnaire. Then the responses, along with opinions and justifications, are evaluated, and statistical feedback is given to each panel member. The process continues until group responses converge toward a solution. [Planning]

PMI®, *PMBOK® Guide*, 2013, 324

Wideman 1992, C-2 and C-3

8. a. An unplanned response to a negative risk event

Used in control risks, a workaround is a response to a threat that has occurred for which a prior response had not been planned or was not effective. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 567

9. d. Monte Carlo analysis

Simulations are typically performed using Monte Carlo in which a project model is computed many times with the input values chosen at random for each iteration from the probability distribution of these variables. Monte Carlo analysis supports various statistical distributions (normal, triangular, beta, uniform, etc.) used in estimating budgets, schedules, and resource allocations. [Planning]

Frame 2002, 89

PMI®, *PMBOK® Guide*, 2013, 340

10. b. 13 percent

Probability (starting activity 4 on day 6) = $(0.5)^3$
= 0.125 or 13%

[Planning]

PMI®, *PMBOK® Guide*, 2013, 331

11. c. Schedule network diagram and duration estimates

When determining the likelihood of meeting the project's schedule end date through Monte Carlo, the schedule network diagram and duration estimate are used as inputs to the simulation program. Cost risk, on the other hand, uses cost estimates from the WBS. [Planning]

PMI®, *PMBOK® Guide*, 2013, 340

12. a. Use a beta or triangular probability distribution

Interviews often are used to help quantify the probability and consequences of risks on project objectives. The type of information collected during the interview depends on the type of probability distribution that is used. A beta or triangular distribution is used widely when information is gathered on the optimistic (low), pessimistic (high), and most likely scenarios. [Planning]

PMI®, *PMBOK® Guide*, 2013, 336–337

13. c. Accepts the consequences of the risk event should it occur

Accepting the consequences of the risk event is categorized as risk acceptance. With this risk response approach, the project team takes no action to reduce the probability of the risk's occurring. [Planning]

PMI®, *PMBOK® Guide*, 2013, 344–345

14. d. 56 percent

The likelihood is determined by multiplying the probability of event 1 by the probability of event 2. [Planning]

PMI®, *PMBOK® Guide*, 2013, 331–332

Wideman 1992, IV-7

15. a. Identifies project assumptions

Project assumptions, which should be enumerated in the project scope statement, are areas of uncertainty, and as such are potential causes of project risk. The scope statement and the WBS are part of the scope baseline, an input to identify risks. [Planning]

PMI®, *PMBOK® Guide*, 2013, 322

16. c. Watch list

Even low-priority risks must be monitored. A watch list is used to ensure such risks are tracked for continued monitoring. [Planning]

PMI®, *PMBOK® Guide*, 2013, 347

17. d. Any risks that cannot be known before they occur

There is a category of risks that is sometimes called unknown-unknowns, meaning that the risk is not knowable and, therefore, the probability of the risk is also not knowable. Your lead technical advisor becoming seriously ill, your offices being ransacked by persons engaged in industrial espionage, or one of your subcontractors winning the lottery and running off to the Cayman Islands are all examples of risks that are not known before they occur. However, such risks must be expected and a general contingency can be set aside to address the impact they leave in their wake. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 310, 346, 348, and 533

Pritchard 2005, 183–188

18. b. Sensitivity analysis

Sensitivity analysis, as a quantitative risk analysis and modeling technique, helps to determine the risks that have the most potential impact on the project. It examines the extent to which the uncertainty of each project element affects the objective being examined when all other uncertain elements are held at their baseline values. [Planning]

PMI®, *PMBOK® Guide*, 2013, 338

Wideman 1992, C-1 and C-2

19. d. \$900,000

$$EMV = (\$2M \times 60\%) + (-\$1.5M \times 20\%) =$$

$$(\$1.2M) + (-\$300,000) = \$900,000$$

[Planning]

Frame 2002, 192

PMI®, *PMBOK® Guide*, 2013, 339

20. c. Active acceptance

Active acceptance means not only accepting the consequences of a risk, but also establishing a plan for dealing with the risk, should it occur. Organizations typically establish a contingency plan funded by a contingency reserve (of time, money, or resources) to handle known, or even sometimes potential unknown, threats or opportunities. [Planning]

PMI®, *PMBOK® Guide*, 2013, 345

21. d. Forecast potential deviation of the project at completion from cost and schedule targets

Earned value is used for monitoring overall project performance against a baseline plan. It is a part of variance analysis, a tool and technique in control risks. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 352

22. b. Assign a relative value to the impact on project objectives if the risk in question occurs

You can develop relative or numeric, well-defined scales using agreed-upon definitions by the stakeholders. When using a numeric scale, each level of impact has a specific number assigned to it. [Planning]

PMI®, *PMBOK® Guide*, 2013, 331–332

23. b. Product of the probability and impact of the risk

The risk score provides a convenient way to compare risks because comparing impacts or probabilities alone is meaningless. It helps guide risk responses. [Planning]

PMI®, *PMBOK® Guide*, 2013, 332

24. c. Performing the contingency plan

Corrective action in risk management is the process of making changes to bring expected performance in line with the risk management plan. Such action consists of performing either the planned risk response, such as implementing contingency plans, or a workaround. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 353

25. b. Forces consideration of the probability of each outcome

As a graphical way to bring together information, decision-tree analysis quantifies the likelihood of failure and places a value on each decision. Usually applied to cost and time considerations, this form of risk analysis may be linked to a sensitivity analysis. [Planning]

PMI®, *PMBOK® Guide*, 2013, 339

Wideman 1992, C-2 and C-3

26. b. Potential risk response

The risk register is prepared first in the identify risks process. It contains a list of identified risks in as much detail as possible and a list of potential responses when they are identifiable at this time. [Planning]

PMI®, *PMBOK® Guide*, 2013, 327

27. b. Checklists for identify risks

Checklists are a tool and a technique of the identify risks process and include risks encountered on similar, previous projects identified through the lessons learned process and from other sources. The project team should review the checklist as part of the identify risks process as well as during closeout. The team should add to the list as necessary, based on its experience, to help others in the future. [Planning]

PMI®, *PMBOK® Guide*, 2013, 325

28. d. Reducing the probability and/or impact of an adverse risk event to an acceptable threshold

It is often more effective to take early action to reduce probability and/or impact of a risk occurring on a project than attempting to repair the damage after the risk has occurred. [Planning]

PMI®, *PMBOK® Guide*, 2013, 345

29. a. During the concept phase

Risks are highest at the beginning of a project because the project faces an uncertain future, and impacts are lowest at this time because investments in human and material resources are minimal. [Planning]

Frame 2002, 80; PMI®, *PMBOK® Guide*, 2013, 40

Wideman 1992, II-1-II-5

30. c. Schedule management plan and cost management plan

The cost and schedule of a project are two areas significantly affected by risk occurrences. Information on these two areas, because of their quantitative nature, provides excellent input to the perform quantification risk process to help determine overall impact and to provide guidelines as managing risk reserves. [Planning]

PMI®, *PMBOK® Guide*, 2013, 335

31. c. Implementation and closeout

Opportunity and risk generally remain high during the concept and planning phases. However, the amount at stake remains low because of the relatively low level of investment up to that point. During project implementation and closeout, however, risk falls to lower levels as remaining unknowns are translated into knowns. At the same time, the amount at stake rises steadily as the necessary resources are invested to complete the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 40; Wideman 1992, II-5–II-6

32. b. It is an input to identify risks.

Much of the output from planning in other knowledge areas, such as activity cost and duration estimates, may entail risk and is reviewed during the identify risks process. This process requires an understanding of the schedule, cost, and quality management plans found in the project management plan. Estimates that are aggressive or developed with a limited amount of information are even more likely to entail risk and, therefore, must also be an input to the identify risks process. [Planning]

PMI®, *PMBOK® Guide*, 2013, 321–322

33. c. Risk reassessments are regularly scheduled; risk audits are performed as defined in the project's risk management plan.

Risk reassessment is an ongoing activity by the project team. Risks should be discussed at every status meeting. Risk audits are performed during the project life cycle to examine and document the effectiveness of risk responses. They are conducted at appropriate frequencies as defined in the risk management plan. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 351

34. a. Data quality assessment

Perform qualitative risk analysis requires accurate and unbiased data. The use of low-quality data may result in a qualitative risk analysis that is of little use to the project manager regarding understanding of the risk, data available about the risk, data quality, and data reliability and integrity. [Planning]

PMI®, *PMBOK® Guide*, 2013, 332

35. b. Exploit

Although it might have a negative connotation, exploitation is a strategy used for risks with positive impacts where the organization wants to ensure that the opportunity is realized. [Planning]

PMI®, *PMBOK® Guide*, 2013, 345

36. d. Ensuring that each risk identified and deemed critical has a computed expected value

It is not feasible or necessary to quantify every risk. Therefore, a risk audit should never have as an objective to ensure that each project risk has a computed expected value. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 351

37. a. Defining the steps to be taken if an identified risk event should occur

For some risks it is appropriate for the project team to make a response plan that will be executed only under certain predefined conditions if it is believed that there will be sufficient warning to implement the plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 346

38. b. A risk taken to achieve a reward

Project risk has its origin in the uncertainty that is present in all projects. Organizations and stakeholders are willing to accept varying degrees of risk, and risks that are threats to the project may be accepted if the risks are within tolerances and are in balance with the rewards to be gained. This example of adopting a fast-track schedule is a risk taken to achieve the reward created by the earlier completion date. [Planning]

PMI®, *PMBOK® Guide*, 2013, 345

39. a. Use a probability and impact matrix

The probability and impact matrix can be used to classify risks according to their level of impact and to prioritize them for future quantitative analyses and responses based on their rating. Typically these risk rating rules are specified by the organization in advance of the project. The matrix specifies combinations of probability and impact that lead to rating the risks as low, moderate, or high priority. [Planning]

PMI®, *PMBOK® Guide*, 2013, 331–332

40. d. Avoidance

Risk avoidance involves changing the project management plan to eliminate the threat entirely. [Planning]

PMI®, *PMBOK® Guide*, 2013, 344

Project Procurement Management

Study Hints

The Project Procurement Management questions on the PMP® certification exam tend to be more process oriented than legally focused. You do not need to know any country's specific legal code; however, some non-U.S. exam takers complain that the nature of many of the questions requires an understanding of U.S. contract law. Although an occasional question relating to the U.S. system may appear on the exam, such questions do not seem to be problematic for most exam takers. A firm understanding of the procurement process usually will help you to find the correct answer. Moreover, the questions will be worded such that the project manager or project team is the "buyer."

The exam requires you to know the basic differences between the three broad categories of contracts (fixed-price, cost-reimbursement, and time-and-materials) and the risks inherent in specific contract types for both the buyer and the seller. Several questions will also test your knowledge of the various types of contracts within each category (for example, firm-fixed-price versus fixed-price-incentive-fee contracts).

A question or two may also be included on international contracting, such as the timing of foreign currency exchange and duty on goods delivered to a foreign country.

PMI® views Project Procurement Management as a four-step process comprising plan procurement management, conduct procurements, control procurements, and close procurements. See *PMBOK® Guide* Figure 12-1 for an overview of this structure. Know this chart thoroughly.

Following is a list of the major Project Procurement Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Project procurement management overview

Plan procurement management

- Make-or-buy analysis
- Procurement management plan
- Procurement statement of work
- Contract categories and risks
- Fixed-price
- Cost-reimbursement
- Time-and-materials
- Contract types and risks
- Cost-plus-fixed-fee
- Cost-plus-incentive-fee
- Cost-plus-award-fee
- Fixed-price-incentive-fee
- Firm-fixed-price
- Fixed price with economic price adjustments
- Contract incentives
- Contract origination
- Source selection criteria
- Procurement documents
- Make-or-buy decisions
- Change requests

Conduct procurements

- Proposals
- Qualified seller list
- Evaluating prospective sellers
- Contract negotiation
- Weighting system
- Screening system
- Independent estimates
- Proposal evaluation techniques

- Bidder conferences
- Expert judgment
- Analytical techniques
- Contract negotiation stages and tactics
- Five stages
- Negotiation tactics
- Selected sellers
- Agreements
- Contracts

Control procurements

- Procurement documents
- Standard clauses
- Elements of a legally enforceable contract
- Changes and change control
- Undefined work
- Procurement performance reviews
- Claims administration
- Records management system

Close procurements

- Contract closure procedure
- Procurement audit
- Procurement negotiations
- Closed procurements

Organizing for contract management

- Centralized contracting
- Decentralized contracting

Privity of contract

Foreign currency exchange

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. What doctrine causes a party to relinquish rights under a contract because it knowingly fails to execute those rights?
 - a. Assignment of claims
 - b. Material breach
 - c. Waiver
 - d. Warranties

2. Which term describes those costs in a contract that are associated with two or more projects but are not traceable to either of them individually?
 - a. Variable
 - b. Direct
 - c. Indirect
 - d. Semivariable

3. Contract type selection is dependent on the degree of risk or uncertainty facing the project manager. From the perspective of the buyer, the preferred contract type in a low-risk situation is—
 - a. Firm-fixed-price
 - b. Fixed-price-incentive
 - c. Cost-plus-fixed fee
 - d. Cost-plus-a-percentage-of-cost

4. The buyer has negotiated a cost-plus-incentive fee contract with the seller. The contract has a target cost of \$300,000, a target fee of \$40,000, a share ratio of 80/20, a maximum fee of \$60,000, and a minimum fee of \$10,000. If the seller has actual costs of \$380,000, how much fee will the buyer pay?
 - a. \$104,000
 - b. \$56,000
 - c. \$30,000
 - d. \$24,000
5. Which term describes the failure by either the buyer or the seller to perform part or all of the duties of a contract?
 - a. Termination of contract
 - b. Partial performance
 - c. Breach of contract
 - d. Contract waiver
6. In some cases, contract termination refers to—
 - a. Contract closeout by mutual agreement
 - b. Contract closeout by delivery of goods or services
 - c. Contract closeout by successful performance
 - d. Certification of receipt of final payment
7. Significant differences between the seller's price and your independent estimate may indicate all the following EXCEPT the—
 - a. SOW was not adequate
 - b. Seller misunderstood the SOW
 - c. Sellers failed to respond
 - d. Project team chose the wrong contract type

8. You are a contractor for a state agency. Your company recently completed a water resource management project for the state and received payment on its final invoice today. A procurement audit has been conducted. Formal notification that the contract has been closed should be provided to your company by the—
 - a. State's project manager
 - b. Person responsible for procurement administration
 - c. Project control officer
 - d. Project sponsor or owner
9. Which term describes contract costs that are traceable to or caused by a specific project work effort?
 - a. Variable
 - b. Fixed
 - c. Indirect
 - d. Direct
10. When a seller breaches a contract, the buyer cannot receive—
 - a. Compensatory damages
 - b. Punitive damages
 - c. Liquidated damages
 - d. Consequential damages
11. Which term is NOT a common name for a procurement document that solicits an offer from prospective sellers?
 - a. Contractor initial response
 - b. Request for information
 - c. Request for quotation
 - d. Invitation for negotiation

12. Because you are working under a firm-fixed-price contract, management wants you to submit the final invoice and close out the contract as soon as possible. Before final payment on the contract can be authorized, you must—
- Prepare a contract completion statement
 - Audit the procurement process
 - Update and archive contract records
 - Settle subcontracts
13. Recent data indicate that more than 10,000 airline passengers are injured each year from baggage that falls from overhead bins. You performed a make-or-buy analysis and decided to outsource an improved bin design and manufacture. The project team needs to develop a list of qualified sources. As a general rule, which method would the project team find especially helpful?
- Advertising
 - Internet
 - Trade catalogs
 - Relevant local associations
14. As you prepare to close out contracts on your project, you should review all the following types of documentation EXCEPT the—
- Contract document for the contract being closed
 - Procurement audit report
 - Invoice and payment records
 - Seller performance reports

15. You are working on a new project in your organization. You need to decide how best to staff the project and handle all its resource requirements. Your first step should be to—
 - a. Conduct a make-or-buy analysis
 - b. Conduct a market survey
 - c. Solicit proposals from sellers using an RFP to determine whether you should outsource the project
 - d. Review your procurement department's qualified-seller lists and send an RFP to selected sellers

16. Your company decided to award a contract for project management services on a pharmaceutical research project. Because your company is new to project management and does not understand the full scope of services that may be needed under the contract, it is most appropriate to award a—
 - a. Firm-fixed-price contract
 - b. Fixed-price-incentive contract
 - c. Cost-plus-a-percentage-of-cost contract
 - d. Time-and-materials contract

17. Requirements for formal contract acceptance and closure usually are defined in the—
 - a. Proposal
 - b. Statement of work
 - c. Contract terms and conditions
 - d. Procurement audit report

18. You plan to award a contract to provide project management training for your company. You decide it is important that any prospective contractor have an association with a major university that awards master's certificates in project management. This is an example of—
 - a. Setting up an independent evaluation
 - b. Preparing requirements for your statement of work
 - c. Establishing a weighting system
 - d. Establishing source selection criteria
19. All the following elements must be evident in a written contract for it to be legally enforceable EXCEPT—
 - a. Legal capacity
 - b. Mutual assent
 - c. Appropriate form
 - d. Pricing structure
20. A purchase order is a good example of which form of contracting?
 - a. Unilateral
 - b. Bilateral
 - c. Trilateral
 - d. Severable
21. You are responsible for ensuring that your seller's performance meets contractual requirements. For effective contract control, you should—
 - a. Hold a bidders' conference
 - b. Establish the appropriate contract type
 - c. Implement the contract change control system
 - d. Develop a statement of work

22. The primary benefit of contract control procurements is to ensure that—
- a. Buyers conduct performance reviews
 - b. Payment is made in a timely fashion
 - c. Disagreements are handled quickly and to everyone's satisfaction
 - d. Both parties meet contractual obligations and protect their legal rights
23. Buyers use a variety of methods to provide incentives to a seller to complete work early or within certain contractually specified time frames. One such incentive is the use of liquidated damages. From the seller's perspective, liquidated damages are what form of incentive?
- a. Positive
 - b. Negative
 - c. Nominal
 - d. Risk-prone
24. The principal function of a warranty is to—
- a. Provide assurance of the level of quality to be provided
 - b. Provide a way to assert claims for late payment
 - c. Provide a way to allow additional time following acceptance to correct deficiencies, without additional costs
 - d. Ensure that goods purchased fit the purposes for which they are to be used

25. You have decided to award a contract to a seller that has provided quality services to your company frequently in the past. Your current project, although somewhat different from previous projects, is similar to other work the seller has performed. In this situation, to minimize your risk you should award what type of contract?
- a. Fixed price with economic price adjustment
 - b. Fixed-price-incentive (firm target)
 - c. Firm-fixed-price
 - d. Cost-plus-award-fee
26. As project manager, you need a relatively fast and informal method addressing disagreements with contractors. One such method is to submit the issue in question to an impartial third party for resolution. This process is known as—
- a. Alternative dispute resolution
 - b. Problem processing
 - c. Steering resolution
 - d. Mediation litigation
27. A no-cost settlement sometimes is used—
- a. To close out a successful contract
 - b. In lieu of formal termination procedures
 - c. When buyer property has been furnished under the contract
 - d. When such an arrangement is acceptable to one of the parties involved

28. When writing payment terms in your fixed-price sub-contracts it is especially important to—
- a. Include incentives if the seller exceeds or fails below defined objectives
 - b. Provide flexibility to redirect the seller if the scope of work is not defined precisely confusion
 - c. Link progress made to compensation paid
 - d. Associate the payment to a specific time period for more efficient accounting
29. A buyer has negotiated a fixed-price-incentive-fee contract with the seller. The contract has a target cost of \$200,000, a target profit of \$30,000, and a target price of \$230,000. The buyer also has negotiated a ceiling price of \$270,000 and a share ratio of 70/30. If the seller completes the contract with actual costs of \$170,000, how much profit will the buyer pay the seller?
- a. \$21,000
 - b. \$35,000
 - c. \$39,000
 - d. \$51,000
30. Requirements for formal deliverable acceptance are defined in the—
- a. Contract
 - b. Procurement management plan
 - c. Overall project management plan
 - d. Specifications

31. Payment bonds are often required by the contract and require specific actions under the stated conditions. Payment bonds are specifically designed to ensure that the prime contractor provides payment of—
 - a. Insurance premiums
 - b. Weekly payrolls
 - c. Subcontractors, laborers, and sellers of material
 - d. Damages for accidents caused
32. You are working on a contract in a remote location. The contract requires you to be on site at the office on a daily basis. You were unable to get to the office for three days last month because of severe blizzard conditions. Your failure to appear at the office was excused because of a clause in the contract entitled—
 - a. Non compos mentis
 - b. Forjurer royalme
 - c. Force majeure
 - d. Force minoris dictus
33. All of the following are examples of good control procurement skills that project managers need to exercise EXCEPT—
 - a. Approving invoices as the work is completed
 - b. Supervising the work to be done under the terms of the contract
 - c. Developing contract clauses
 - d. Preparing and processing change requests
34. The best approach to resolve the settlement of all outstanding contract changes, claims, and disputes is using—
 - a. Litigation
 - b. Alternative dispute resolution
 - c. Negotiation
 - d. Mediation

35. On large contracts, the contract administrator typically has a need to resolve ambiguity in the clauses that govern work performance and other issues. Assume that on your contract there is an order of precedence clause. This means that—
- Inconsistencies in the solicitation of the contract shall be resolved in a given order of procedure
 - An alternative dispute resolution process is in place that shall be followed to resolve any conflicts
 - Any ambiguities are generally interpreted against the party who drafted the document
 - Undefinitized contractual actions cannot be authorized
36. During contract negotiations on large contracts, the negotiation process focuses on many key issues, with price being one of them. Separate negotiations can be made on price, quantity, quality, and timing, which can significantly lengthen the process. The negotiation process can be shortened, however, provided that—
- Planning is done for negotiations
 - Expertise of the project management staff in the procurement process is at a high level
 - A request for proposal is used rather than a request for quotation
 - There is integrity in the relationship and prior history with the vendor
37. Contract negotiations are NOT required when—
- A company uses sealed bids
 - There is a sole source procurement
 - A competitive range is established
 - A two-step process is used

38. It is critical during the proposal preparation stage that—
 - a. The negotiation strategy is determined
 - b. A change management strategy is developed
 - c. Roles and responsibilities for the ultimate project are determined
 - d. Contract terms and conditions are reviewed before the proposal is submitted to the client

39. Which of the following types of contracts has the least risk to the seller?
 - a. Firm-fixed-price
 - b. Cost-plus-fixed-fee
 - c. Cost-plus-award-fee
 - d. Fixed-price-incentive fee

40. Assume that your company has a cost-plus-fixed-fee contract. The contract value is \$110,000, which consists of \$100,000 of estimated costs with a 10-percent fixed fee. Assume that your company completes the work but only incurs \$80,000 in actual cost. What is the total cost to the project?
 - a. \$80,000
 - b. \$90,000
 - c. \$10,0000
 - d. \$125,000

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d

21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. c. Waiver

Under the doctrine of waiver, a party can relinquish rights that it otherwise has under the contract. If the seller offers incomplete, defective, or late performance, and the buyer's project manager knowingly accepts that performance, the buyer has waived its right to strict performance. In some circumstances, the party at fault may remain liable for provable damages, but the waiver will prevent the buyer from claiming a material breach and, thus, from terminating the contract. [Executing]

Adams et al. 1997, 275

Kerzner, 2009, 850

2. c. Indirect

The nature of an indirect cost is such that it is neither possible nor practical to measure how much of the cost is attributable to a single project. These costs are allocated to the project by the performing organization as a cost of doing business. [Planning]

PMI®, *PMBOK® Guide*, 2013, 202, 365

3. a. Firm-fixed-price

Buyers prefer the firm-fixed-price contract because it places more risk on the seller. Although the seller bears the greatest degree of risk, it also has the maximum potential for profit. Because the seller receives an agreed-upon amount regardless of its costs, it is motivated to decrease costs by efficient production. [Planning]

Adams et al. 1997, 229–231

PMI®, *PMBOK® Guide*, 2013, 363

4. d. \$24,000

Comparing actual costs with the target cost shows an \$80,000 overrun. The overrun is shared 80/20 (with the buyer's share always listed first). In this case 20% of \$80,000 is \$16,000, the seller's share, which is deducted from the \$40,000 target fee.

The remaining \$24,000 is the fee paid to the seller.

[Planning and Closing]

Garrett 2007, 123

PMBOK® Guide, 2013, 364

5. c. Breach of contract

A breach of contract is a failure to perform either express or implied duties of the contract. Either the buyer or the seller can be responsible for a breach of contract. [Executing]

Adams et al. 1997, 278

Ward 2008, 45

Kerzner, 2009, 849

6. a. Contract closeout by mutual agreement

A contract can end in successful performance, mutual agreement, or breach of contract. Contract closeout by mutual agreement or breach of contract is called contract termination. [Closing]

Garrett 2007, 185, *PMBOK® Guide*, 2013, 387

7. d. Project team chose the wrong contract type

The contract type is typically dictated by the procurement SOW and chosen by the contracting officer. Independent estimates are a tool and technique in conduct procurements. [Executing]

PMI®, *PMBOK® Guide*, 2013, 376

8. b. Person responsible for procurement administration

The person responsible for procurement administration should provide, in writing, formal notification that the contract has been completed. Requirements for formal acceptance and closeout should be defined in the contract. [Closing]

PMI®, *PMBOK® Guide*, 2013, 389

9. d. Direct

Direct costs are always identified with the cost objectives of a specific project and include salaries, travel and living expenses, and supplies in direct support of the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 202, 207, and 365

10. b. Punitive damages

Punitive damages are designed to punish a guilty party and, as such, are considered penalties. Because a breach of contract is not unlawful, punitive damages are not awarded. The other remedies listed are available to compensate the buyer's loss. [Closing]

Ward 2008, 357

11. b. Request for information

Procurement documents are used to solicit proposals from prospective sellers. A request for information is generally used by the buyer to have potential sellers propose various pieces of information related to a product, service, or result or to a seller capability. [Planning]

PMI®, *PMBOK® Guide*, 2013, 368

12. d. Settle subcontracts

All payments due must be settled by the seller before the contract can be officially closed. The other items listed are activities performed by the buyer. [Closing]

Garrett 2007, 128–133

13. a. Advertising

Advertising in newspapers or specialty trade publications is an excellent way to identify qualified bidders. Detailed information about specific sources may require more extensive effort, such as site visits or contact with previous customers. [Executing]

PMI®, *PMBOK® Guide*, 2013, 376

14. b. Procurement audit report

In most organizations, a procurement audit is conducted after the contract has been closed. Therefore, the project manager would not have a procurement audit report to review. Contract document for the contract being closed, invoice and payment records, and seller performance reports are examples of the documents that should be available to the project manager and should be reviewed at closeout. [Closing]

PMI®, *PMBOK® Guide*, 2013, 388–389

15. a. Conduct a make-or-buy analysis

A make-or-buy analysis is a plan procurement management tool and technique used to determine whether a particular product, service, or result can be produced or performed cost effectively by the performing organization or should be contracted out to another organization. The analysis includes both direct and indirect costs and any administrative costs incurred to manage the contractor. [Planning]

PMI®, *PMBOK® Guide*, 2013, 365

16. d. Time-and-materials contract

A time-and-materials contract is a type of contract that provides for the acquisition of supplies or services on the basis of direct labor hours, at specified fixed hourly rates for wages, overhead, general and administrative expenses, and profit; and materials at cost, including materials-handling costs. [Planning]

PMI®, *PMBOK® Guide*, 2013, 364

17. c. Contract terms and conditions

The contract terms and conditions typically describe the procedure the buyer will employ to close the contract. [Closing]

PMI®, *PMBOK® Guide*, 2013, 377–378, 387

18. d. Establishing source selection criteria

The selection criteria are typically included in procurement documents and are then used to rate or score proposals. [Planning]

PMI®, *PMBOK® Guide*, 2013, 368–369

19. d. Pricing structure

The following elements must be present for a contract to be legally enforceable: legal capacity, mutual assent, consideration, legality, and an appropriate contract form that follows applicable laws governing businesses. [Executing]

Adams et al. 1997, 240

20. a. Unilateral

The purchase order is a unilateral (one signature) offer that includes a promise to pay upon delivery. [Planning]

Adams et al. 1997, 231

21. c. Implement the contract change control system

Contract change control entails ensuring that contract changes are properly approved and that everyone who needs to know is made aware of such changes. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 383

22. d. Both parties meet contractual obligations and protect their legal rights

Contracts are awarded to obtain goods and services in accordance with the buyer's stated requirements. Although there are multiple purposes in the control procurements process, ensuring that the seller delivers what is stated in the contract is of paramount importance. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 379

23. b. Negative

Liquidated damages are considered negative incentives because they result in a loss of revenue for the seller if it fails to perform rather than a gain in revenue if it performs well. [Closing]

Ward 2008, 251

Kerzner, 2009, 849

24. a. Provide assurance of the level of quality to be provided

A warranty is one party's assurance to the other that goods will meet certain standards of quality, including condition, reliability, description, function, or performance. This assurance may be express or implied. [Executing]

Adams et al. 1997, 272

Kerzner, 2009, 850

PMI®, *PMBOK® Guide*, 2013, 369

25. c. Firm-fixed-price

In a firm-fixed-price contract, the seller receives a fixed sum of money for the work performed regardless of costs. This arrangement places the greatest financial risk on the seller and encourages it to control costs. [Planning]

Adams et al. 1997, 229

PMI®, *PMBOK® Guide*, 2013, 363

26. a. Alternative dispute resolution

Alternative dispute resolution, or dispute resolution, is a relatively informal way to address differences of opinion on contracts. Its purpose is to address such issues without having to seek formal legal redress through the courts. [Executing, Monitoring and Controlling, and Closing]

Ward 2008, 15–17

PMI®, *PMBOK® Guide*, 2013, 378, 384, 388

27. b. In lieu of formal termination procedures

A no-cost settlement can be used in lieu of formal termination procedures when the seller has indicated that such an arrangement is acceptable, no buyer property has been furnished under the contract, no payments are due the seller, no other obligations are outstanding, and the product or service can be readily obtained elsewhere. [Closing]

Garrett 2007, 191

28. c. Link progress made to compensation paid

A buyer under a fixed-price contract should pay a seller for work delivered rather than time expended. Linking payment with progress ensures that the seller will focus on results and not on effort expended. [Planning]

Garrett 2007, Chapter 8

PMI®, *PMBOK® Guide*, 2013, 362–363

29. c. \$39,000

To calculate the fee that the buyer must pay, actual costs are compared with the target cost. If actual costs are less than the target cost, the seller will earn profit that is additional to the target profit. If actual costs are more than the target cost, the seller will lose profit from the target profit. The amount of profit is determined by the share ratio (with the buyer's share listed first). In this example, the seller is under target cost by \$30,000. That amount will be split 70/30. So the buyer keeps \$21,000, and the seller receives an additional \$9,000 added to the target profit, which is the incentive. Total fee is \$39,000. [Planning and Closing]

Garrett 2007, 123

PMI®, *PMBOK® Guide*, 2013, 362–363

30. a. Contract

Two important components of any contract include what the buyer wants to buy and how the buyer defines acceptance of the products or services delivered. For contract closure to occur, deliverable acceptance must be completed. [Closing]

PMI®, *PMBOK® Guide*, 2013, 389

31. c. Subcontractors, laborers, and sellers of material

Payment bonds, which are required by the buyer, are issued by guarantors to prime contractors. The buyer wants to ensure that subcontractors of the prime contractor receive payment so that work is not disrupted. [Closing]

Adams et al. 1997, 273

32. c. Force majeure

Force majeure clauses can be used to protect either party from events that are outside their control and not a result of their negligence, such as acts of nature, war, civil disobedience, or labor disruption. [Executing]

Garrett 2007, 56

Kerzner, 2009, 849

33. c. Developing contract clauses

First, developing contract clauses is done during contract formation, not control procurements, which begins at contract signing. Second, contract specialists and attorneys—given their legal expertise—are typically the individuals who write contract clauses, not project managers. [Monitoring and Controlling]

Verma 1995, 63

PMI®, *PMBOK® Guide*, 2013, 381–384

34. c. Negotiation

While there are a variety of ways to settle claims, disputes, and changes, the preferred approach is negotiation. It is a strategy to work toward compromise or to reach an agreement that both parties can accept. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 384, 517

35. a. Inconsistencies in the solicitation of the contract shall be resolved in a given order of procedure

The order of precedence specifies that any inconsistency in the contract shall be resolved in a given order. This avoids confusion and debate, which could lead to litigation. [Monitoring and Controlling]

Kerzner 2009, 860

36. d. There is integrity in the relationship and prior history with the vendor

When people know and trust one another, and in particular have worked with each other before, the negotiation process can be significantly shortened. Three major factors of negotiation should be followed: compromise ability, adaptability, and good faith. [Executing]

Kerzner 2009, 848

37. a. A company uses sealed bids

When using the sealed bid method, competitive market forces determine the price, and the award goes to the lowest bidder, provided all other terms and conditions of the contract are met. [Executing]

Kerzner 2009, 847

38. d. Contract terms and conditions are reviewed before the proposal is submitted to the client

The contracts (legal) representative is responsible for the preparation of the contract portion of the proposal. Generally, contracts with the legal department are handed through or in coordination with the proposal group. Before the proposal is submitted to the client, contract terms and conditions should be reviewed and approved. [Executing]

Kerzner 2009, 866

39. b. Cost-plus-fixed-fee

On a firm-fixed-price contract, the seller absorbs 100 percent of the risks; while on a cost-type contract, the buyer carries the most risk. Cost-plus-fixed-fee contracts have less risk to sellers than cost-plus-award-fee or cost-plus-incentive-fee contracts because the fee is fixed based on costs, so the seller is guaranteed a certain level of profit. [Planning]

PMI®, *PMBOK® Guide*, 2013, 364

40. b. \$90,000

In this situation the fixed-fee of \$10,000 does not change but now represents a seller profit of 12.5 percent on incurred costs. This means that the total cost to the project is \$90,000. [Closing]

Fleming 2003, 97

PMI®, *PMBOK® Guide*, 2013, 363–364

Project Stakeholder Management

Study Hints

Project Stakeholder Management was added as a tenth knowledge area in the *PMBOK® Guide*—Fifth Edition. The four processes cover four of the five processes in the PMP® certification exam. Stakeholder management is expanded because identifying and analyzing stakeholder expectations and their impact on the project and developing management techniques to effectively engage stakeholders in project decisions and execution are critical to project success. The project manager and his or her team must have a continuous dialogue with stakeholders to meet their needs and expectations, address any issues they may have, and foster the level of appropriate stakeholder engagement in project decisions and activities.

With Project Stakeholder Management as a separate knowledge area, the importance of working with stakeholders on a project is emphasized. It involves focusing on managing the expectations of the project's stakeholder groups and engaging them in the project as appropriate. Research in the project management field further has shown that stakeholder engagement is one of the major keys to project success.

Questions in this knowledge area will address the key stakeholders on projects as well as areas covered in its four process groups. The four processes not only interact with one another but also interact with processes in the other nine knowledge areas. You need to study these processes carefully to become familiar with PMI®'s terminology and perspectives. *PMBOK® Guide* Figure 13-1 provides an overview of the structure of Project Stakeholder Management. Know this chart thoroughly.

Following is a list of the major Project Stakeholder Management topics. Use it to help focus your study efforts on the areas most likely to appear on the exam.

Major Topics

Stakeholder definition

Types of stakeholders on projects

Identify stakeholders

- Stakeholder analysis
- Preparation
- Classification models
- Meetings
- Stakeholder register

Plan stakeholder management

- Project management plan
- Organizational process assets
- Enterprise environmental factors
- Expert judgment
- Analytical techniques
- Stakeholder engagement assessment matrix
- Contents of the stakeholder management plan

Manage stakeholder engagement

- Key activities
- Communications management plan
- Change log
- Communications methods
- Interpersonal skills
- Management skills
- Issue log
- Organizational process assets updates

Control stakeholder engagement

- Work performance data
- Information management systems
- Work performance information
- Change requests

Practice Questions

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. During your project, you will have a number of different types of meetings. Some will be informational, others will be key updates, and some will be for decision-making purposes. While different attendees will attend each meeting, a best practice to follow is to:
 - a. Group stakeholders into categories to determine which ones should attend each meeting
 - b. Invite those stakeholders who have a high level of interest in your project to attend each meeting
 - c. Be sensitive to the fact that stakeholders often have very different objectives
 - d. Recognize that roles and responsibilities may overlap but practice a policy of 'no surprises' and inform your stakeholders about any upcoming meetings

2. You are managing a project with team members located at customer sites on three different continents. You have a number of stakeholders on your project, and most of them are located outside of the corporate office. Who should be responsible for stakeholder management?
 - a. A specific team member in each of the three locations
 - b. You, because you are the project manager
 - c. The project sponsor
 - d. A core team including you, as the project manager, and three representatives from the three different locations

3. Analyzing stakeholders is a part of the identify stakeholders process. Common approaches for analyzing stakeholders in a qualitative manner includes all the following two-axis grids, EXCEPT—
 - a. Comparing power and influence
 - b. Comparing power and interest
 - c. Comparing influence and location
 - d. Comparing influence and impact
4. You are responsible for a project in your organization that has multiple internal customers. Because many people in your organization are interested in this project, you decide to prepare a stakeholder management strategy. Before preparing this strategy, you should—
 - a. Conduct a stakeholder analysis to assess information needs
 - b. Determine a production schedule to show when each stakeholder needs each type of information produced
 - c. Determine the potential impact that each stakeholder may generate
 - d. Prioritize each stakeholder's level of interest and influence
5. Recognizing the importance of preparing a stakeholder management plan, you met with your team to obtain their buy in and to discuss it. You explained the key benefit of plan stakeholder management is to—
 - a. Determine appropriate strategies for a continual focus on identifying stakeholders throughout the life cycle
 - b. Provide a clear plan that is actionable to interact with stakeholders to support the project's interests
 - c. Develop appropriate management strategies to effectively engage stakeholders
 - d. Plan a series of meetings to ensure stakeholders remain interested and to address their concerns

6. Assume you are actively working, along with your team, to manage stakeholder engagement on your project to develop a new drug to prevent any retina problems of any type. You know you must manage their engagement throughout the project life cycle. This means some organizational process assets will need updating including—
 - a. Informal and formal project reports
 - b. The stakeholder register
 - c. The stakeholder management plan
 - d. Work performance information

7. Stakeholders often have issues, and you have asked each of your team members to document them. At each team meeting, you and your team discuss them and determine appropriate responses. You have a project issue log, which is—
 - a. Part of the project's lessons learned
 - b. Added to the stakeholder register to show which stakeholder raised it
 - c. An output from the manage stakeholder engagement process
 - d. An output from the control stakeholder engagement process

8. As you work on your project to update its software training classes to focus on an agile approach, you have a number of key stakeholders. As many students and their managers are requesting these classes, your CEO has taken a special interest in your project and has asked you to accelerate your schedule to complete it in two months rather than in your planned six months but still have quality offerings. This means as you work to monitor overall project stakeholder relationships, you should—
- a. Provide notifications to stakeholders about status regularly
 - b. Ask your stakeholders for regular feedback as you work on your project
 - c. Provide presentations to each stakeholder group
 - d. Determine how changes will be monitored and controlled
9. As you work with your team to prepare your stakeholder management plan, you decided to develop a stakeholder engagement chart. You set it up so you could—
- a. Show the phase of your project of interest to identified stakeholders
 - b. Show gaps between current and desired levels of engagement
 - c. Determine which stakeholders you and your team felt were critical to project success but did not know about it
 - d. Determine when to involve key stakeholders in your project

10. A number of items in the stakeholder management plan are similar to those in the communications management plan. An example is—
 - a. Method for updating and refining the plans as the project progresses and develops
 - b. Stakeholder communication requirements for the current project phase
 - c. Information to be distributed to stakeholders including language, format, content, and level of detail
 - d. Time frame and frequency for the distribution of required information to stakeholders
11. Having worked as a project manager for nine years, you know how important it is to identify the critical stakeholders so you do not overlook anyone who has a major influence on your project even if you do not ever plan to meet with or talk with this individual. As you work with your team, you explain the key benefit of the identify stakeholder process is that it—
 - a. Identifies the people, groups, or organizations that could impact or influence project decisions
 - b. Shows the interdependencies among project stakeholders to enable classification for how best to involve them on your project
 - c. Identifies the appropriate focus for each stakeholder or a group of stakeholders
 - d. Shows the potential impact each stakeholder has on project success

12. The last step in the stakeholder analysis process is to—
- Determine the organizational culture
 - Assess how stakeholders probably will respond in various situations
 - Determine stakeholder roles, interests, and expectations
 - Evaluate the amount of support each stakeholder could generate
13. You realize that on projects, some stakeholders will not be as receptive as others to your project and actually can be negative from the beginning. Assume you have classified your stakeholders on your project designed to ensure students in your city have access to the best educational resources available, whether in class or on line, your stakeholder management plan is a sensitive document. Therefore, you need to—
- Tell your team to never disclose it to anyone outside the team without consulting you first
 - Involve your team as you develop it but maintain the final copy yourself
 - Review the validity of its underlying assumptions
 - Set up an information distribution system and have each team member sign it for concurrence
14. Stakeholder engagement involves a number of critical activities. An example is—
- Ensuring goals are met through negotiation and communications
 - Developing management strategies to engage them during the project's life cycle
 - Adjusting strategies and plans to engage stakeholders effectively
 - Identifying the scope and impact of changes to project stakeholders

15. Work performance information is an output of control stakeholder engagement. It includes a number of items, one of which is—
 - a. Change requests
 - b. Issue log
 - c. Documented lessons learned
 - d. Status of deliverables

16. Often in working as a project manager, it is easy to overlook key stakeholders. Assume you work for a device manufacturer and are working as the project manager for the next generation valve replacement. Your company has been a leader in this market, which means you have a lot of lessons learned available to you. Your project is scheduled to last four years. As a best practice, you should—
 - a. Work actively with your company's Knowledge Management Officer
 - b. Consult regularly with your program manager
 - c. Work actively with members of your Governance Board
 - d. Work actively with members of your company's Portfolio Review Board

17. Assume you are managing the development of a construction project in your city to replace its five bridges so they are state of the art and meet updated safety standards since they originally were constructed 20 years ago. The design work has been completed, you have awarded subcontracts, and are set to begin construction. Today your legal department told you to stop work as you had not consulted them, and there was a critical standard you overlooked during the design process. This example shows—
- a. You need to continually work to engage stakeholders on your project
 - b. You should use a RACI chart and have one of your team members work with the legal department throughout the project
 - c. You should provide the legal department with a copy of your stakeholder management plan and ask for their representative to sign it and offer any comments
 - d. You need to continually identify project stakeholders

18. Assume your construction project is for a small city with only 8,500 people. There has been opposition to it from the beginning, when the City Commissioners approved it by many residents. The residents recognize they will be severely impacted as the new bridges are implemented, and during the public hearings before the Commissioners' decision, they hired an attorney to state they felt the more cost effective approach was to strengthen the bridges so they met today's safety requirements. Residents now know you have been ordered to stop work, and they have requested a meeting with the Commission on Tuesday. This means you should—
- Develop a mitigation plan to present at this meeting
 - Work diligently with the legal department to satisfy their concerns and receive a go ahead before Tuesday's meeting
 - Demonstrate at the meeting the sustainability impacts of the new bridges
 - Balance the interests of these negative stakeholders and meet with them before Tuesday's meeting
19. The salience model is one way to classify stakeholders. In it—
- Stakeholders' power, urgency, and legitimacy are used
 - Stakeholders' level of authority and concern are used
 - Stakeholders' active involvement and power are used
 - Stakeholders' influence and ability to effect changes are used

20. In plan stakeholder management, all organizational assets are used as inputs; however, which of the following are of particular importance?
- a. Organization culture and the political climate
 - b. Practices and habits and templates
 - c. Lessons learned database and historical information
 - d. Organization's knowledge management system and policies and procedures
21. Assume you have identified your stakeholders and are preparing your stakeholder management plan. You are fortunate that your team is a collocated team as you are working on an internal project to reorganize your IT Department so it is focused more on its customers. The project sponsor is the Chief Operating Officer, and the IT Department Director was surprised as she thought all was well. However, you notice when planning meetings are held, the Chief Financial Officer never attends. You feel since IT affects the entire company, all the senior leaders need some type of involvement. You therefore feel the Chief Financial Officer may be—
- a. Resistant
 - b. Unaware
 - c. Uninterested
 - d. Satisfied
22. Assume your stakeholder management plan has been approved. You now are working with your team to promote stakeholder engagement on your project. You explain in a team meeting its benefit is to—
- a. Clarify and resolve identified issues
 - b. Meet stakeholder needs and expectations
 - c. Obtain their continued commitment to the project
 - d. Increase support and minimize resistance

23. The stakeholder register should not be prepared only one time, but it should be updated regularly especially if—
- a. The stakeholder is not an active participant
 - b. The stakeholder is not impacted by the project
 - c. The stakeholder does not read status updates
 - d. The stakeholder leads a corporate reorganization
24. Working to foster stakeholder engagement, as the project manager, you know a combination of interpersonal skills and general management skills is needed. An example of an key interpersonal skill in stakeholder engagement is—
- a. Facilitating consensus
 - b. Influencing people
 - c. Resolving conflicts
 - d. Negotiating agreements
25. Stakeholder engagement must be controlled on a continuous basis for it to be effective. You realize a number of project documents can be useful for you as a project manager. An example is—
- a. Technical performance measures
 - b. Change log
 - c. Actual costs
 - d. Start and finish dates of schedule activities
26. Expert judgment is a best practice as a tool and technique in many project management processes, and the list of possible sources for experts varies by the organization and by its association with others. One way once you have identified experts who you feel could be of assistance is to—
- a. Use a focus group
 - b. Review documentation
 - c. Hold one-on-one interviews
 - d. Conduct interviews

27. The sponsor is a key project stakeholder because he or she—
 - a. Approves or manages the project's product, service, or result
 - b. Leads the project through initiating until it is formally authorized
 - c. Is the Chairperson of the project's Governance Board and makes the final go/no-go decision
 - d. Has a major management role within the administrative area of the business

28. Recognizing operations management is different than project management, as the project manager for a new line of electrical tractors to avoid the need to use costly fuel, you realize a best practice is to—
 - a. Document the operational managers' influence either positive or negative in the stakeholder register
 - b. Offer to include the operational managers in all project phases
 - c. Recognize that the operational managers are only involved once they have ongoing responsibility for the product, service, or result
 - d. Realize the operations managers have key responsibilities on the Portfolio Review Board

29. Assume you are beginning your project to develop a series of residential condominiums in your city and are identifying possible stakeholders. A key organizational process asset you can review is—
 - a. Organizational culture
 - b. Organizational standards
 - c. Lessons learned
 - d. Local trends

30. One way to develop an understanding of major project stakeholders to exchange and analyze project information about roles and interests is to—
- Conduct interviews
 - Hold profile analysis meetings
 - Use questionnaires and surveys
 - Conduct a stakeholder analysis and analyze the results with a focus group
31. Assume you are managing a project to implement an electronic medical record system in your ophthalmologist's office. You have been working to identify your stakeholders to then make sure everyone is committed to it as some people have been working in this office for more than 20 years and are comfortable with the manual approach. At this point, you have documented assessment information, which includes—
- Role in the project
 - Whether the stakeholder is a supporter, is neutral, or is resistant
 - Potential influence in the project
 - Organization position
32. Having prepared stakeholder management plans on previous projects, you know it is positive to review the project management plan because it—
- Provides information as to how to plan appropriate ways to engage stakeholders
 - Contains information useful to ensure the stakeholder management plan is aligned with the organization's culture
 - Helps to determine the best options to support an adaptive process for stakeholder management
 - Contains a change management plan and documents how changes will be monitored and controlled

33. Assume you have performed your stakeholder analysis and now are working to enhance it with a stakeholder engagement assessment matrix. Such a matrix shows the stakeholder's current engagement level. These data enable—
- a. The project manager to prepare the stakeholder management plan
 - b. The project manager to prepare the stakeholder management strategy
 - c. The project manager to prepare the stakeholder inventory
 - d. The project team to expand the stakeholder risk register
34. The ability of stakeholders to influence a project is—
- a. Constant throughout the project life cycle as different stakeholders have different levels of interest in the project at different times
 - b. Highest during the closing stage since key stakeholder acceptance criteria must be met
 - c. Highest during planning as the team is still in the storming stage as various stakeholders' positions are being known and recognized
 - d. Highest in the very early stages as the project is being approved and initiated

35. Working on your project to design and construct five new bridges for your City, you are striving to actively manage the stakeholders on your project, especially those who will be inconvenienced by the project and have indicated they do not support it. You decided to review your communications management plan as it—
- a. Contains issue management procedures
 - b. Describes the project's life cycle and the processes to be used in each phase
 - c. Sets forth an escalation process
 - d. Provides guidance as to how to best involve stakeholders in the project
36. A supporting input for controlling stakeholder engagement is—
- a. Budget
 - b. Project schedule
 - c. Historical information
 - d. Number of defects
37. As a result of the control stakeholder expectations process, you realize even though this process is under way until the closing phase that you have identified the root cause of some issues you have faced in controlling stakeholders expectations. You should therefore—
- a. Review them with your Governance Board
 - b. Revise and reissue your stakeholder management plan
 - c. Prepare a change request
 - d. Update the lessons learned documentation

38. Identifying interrelationships and potential overlap between stakeholders is useful to the project manager as he or she works with stakeholders. It should be documented as part of the—
 - a. Stakeholder register
 - b. Stakeholder management strategy
 - c. Stakeholder management plan
 - d. Stakeholder engagement assessment matrix
39. A number of organizational process assets are useful as inputs to the manage stakeholder engagement process. Similarly a number of organizational process assets require updates because of this process. An example of one that is an input is—
 - a. Project reports
 - b. Historical information
 - c. Project records
 - d. Stakeholder notifications
40. Table reporting, spreadsheet analysis, and presentations are examples of—
 - a. Project reports as an input to manage stakeholder engagement
 - b. Work performance information as an output of control stakeholder engagement
 - c. Tools and techniques used in control stakeholder engagement
 - d. Updates from the plan stakeholder management process

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
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14.	a	b	c	d
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32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d

Answer Key

1. c. Be sensitive to the fact that different stakeholders often have very different objectives

A project stakeholder is an individual, group, or organization that is actively involved in the project or have interests that may be affected, either positively or negatively, as a result of the performance or completion of the project. Stakeholders also may exert influence on the project and its results. Managing stakeholder expectations is difficult since stakeholders often have different or conflicting objectives. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 30

2. b. You, because you are the project manager

Stakeholder management refers to any action taken by the project manager or project team to satisfy the needs of and to resolve issues with project stakeholders. The ability of the project manager to correctly identify and manage stakeholders appropriately can mean the difference between project success or failure. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 391

3. c. Comparing influence and location

Identifying and analyzing the stakeholders helps to classify them better for developing a strategy to help manage them and their expectations throughout the project. The most common comparison elements are: power, influence, interest, and impact. The location of the person may have an impact on one of the other measures, but it is not easily quantifiable on a low, medium, high, type scale. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 396

4. a. Conduct a stakeholder analysis to assess information needs

Stakeholder analysis is used to analyze the information needs of the stakeholders and to determine the sources for meeting those needs. It helps to determine whose interests should be taken into account throughout the project. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 395–396

5. b. Provide a clear plan that is actionable to interact with stakeholders to support the project's interests

While the plan stakeholder management process develops appropriate management strategies to effectively engage the stakeholders during the project life cycle, the key benefit of this process is to have a plan that is clear and actionable to interact with them to support the project's interests. [Planning]

PMI®, *PMBOK® Guide*, 2013, 399

6. a. Informal and formal project reports

While a number of different organizational process assets require updates as a result of the manage stakeholder engagement process, project reports is one example. They include the formal and informal project reports that describe project status and include lessons learned, issue logs, project closure reports, and outputs from other knowledge areas. [Executing]

PMI®, *PMBOK® Guide*, 2013, 409

7. c. An output of the manage stakeholder engagement process

Issues logs are an output of this process, as issues are expected in this process. The log is updated as new issues are identified, and existing issues are resolved. [Executing]

PMI®, *PMBOK® Guide*, 2013, 408

8. d. Determine how changes will be monitored and controlled

As you work in managing stakeholder engagement you should review your project management plan. Your CEO has requested a major schedule change; among other things the project management plan is an input to this process as it contains a change management plan that documents how changes will be monitored and controlled. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 411

9. b. Show gaps between current and desired levels of engagement

The stakeholder engagement assessment matrix is used as a tool and technique in plan stakeholder management. The purpose of the matrix is to show gaps between current and desired engagement levels to then ensure the plan provides these data. [Planning]

PMI®, *PMBOK® Guide*, 2013, 402–403

10. a. Method for updating and refining the plans as the project progresses and develops

The other items listed have specific stakeholder references that, while similar, are not in the communications management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 296, 403

11. c. Identifies the appropriate focus for each stakeholder or a group of stakeholders

The identify stakeholder process has a number of purposes. It identifies people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project. It analyzes and documents relevant information concerning their interests, involvement, interdependencies, influence and potential impact on project success. Its key benefit is to allow the project manager to identify the appropriate focus for each stakeholder. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 393

12. b. Assess how stakeholders probably will respond in various situations

In stakeholder analysis, the last step is to assess how key stakeholders are likely to react or respond to various situations in order to plan how to influence them to enhance their support and mitigate any potential negative impacts. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 396

13. c. Review the validity of its underlying assumptions

Information on resistant stakeholders can be damaging, and consideration is needed regarding distributing the stakeholder management plan and the stakeholder register. The project manager needs to be aware of the sensitive nature of these documents. When preparing and updating them, the best practice is to review the underlying assumptions to ensure continued accuracy and relevancy. [Planning]

PMI®, *PMBOK® Guide*, 2013, 404

14. a. Ensuring goals are met through negotiation and communications

A key activity in manage stakeholder engagement is to manage stakeholder expectations through negotiation and communications, ensuring project goals are achieved. [Executing]

PMI®, *PMBOK® Guide*, 2013, 405

15. d. Status of deliverables

Work performance information is performance data collected from various controlling processes that are analyzed and integrated based on relationships among areas. The data are transformed into information, which is correlated and contextualized and provides a sound foundation for project decisions. The status of deliverables is an example. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 413

16. c. Work actively with members of your Governance Board

New product development organizations are noted for setting up Governance Boards to oversee projects. Additionally in this situation, it is a long project that is important to the company. Project governance ensures the alignment of the project with stakeholder needs and expectations and is critical to the management of stakeholder expectations and to the achievement of organizational objectives. [Executing]

PMI®, *PMBOK® Guide*, 2013, 30

17. d. You need to continually identify project stakeholders

Stakeholder identification is a continual process throughout the project life cycle. The legal department often is overlooked, but it is a significant stakeholder, and in this situation, delays resulted. Significant expenses often are due to legal requirements that must be met before the project can be completed, or the project scope is delivered. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 31

18. d. Balance the interests of these negative stakeholders and meet with them before Tuesday's meeting

Overlooking negative stakeholders' interests can result in an increased likelihood of failures, delays, or other negative consequences to projects. The project manager must control stakeholder engagement, which can be difficult since they often have different or competing objectives. [Monitoring and Controlling]
PMI®, *PMBOK® Guide*, 2013, 32

19. a. Stakeholders' power, urgency and legitimacy are used

In the salience model, stakeholders are described in classes based on their power or ability to impose their will, urgency or need for immediate action, and legitimacy or their involvement. [Initiating]
PMI®, *PMBOK® Guide*, 2013, 396

20. c. Lessons learned database and historical information

While it is rare that all organizational process assets are used in any process, these are of particular importance as they provide insight on previous stakeholder management plans and their effectiveness. They can be used to plan stakeholder management activities for the current project. [Planning]
PMI®, *PMBOK® Guide*, 2013, 401

21. a. Resistant

Since the Chief Financial Officer has financial responsibility for all of the company's work, in preparing a stakeholder engagement strategy, he or she probably is aware of this project, and probably is resistant to change, perhaps feeling resources could be better spent on other initiatives. [Planning]

PMI®, *PMBOK® Guide*, 2013, 402

22. d. Increase support and minimize resistance

The other possible answers are activities in the manage stakeholder engagement process. Its benefit is to allow the project manager to increase support and minimize resistance from stakeholders to significantly increase chances for success. [Executing]

PMI®, *PMBOK® Guide*, 2013, 404–405

23. b. The stakeholder is not impacted by the project

Project document updates are an output to the manage stakeholder engagement process. These updates involve the stakeholder register. It should be updated as stakeholder information changes, when new stakeholders are identified, or if stakeholders listed in the register are no longer involved in or impacted by the project. [Executing]

PMI®, *PMBOK® Guide*, 2013, 409

24. c. Resolving conflicts

Conflicts are common on projects and between stakeholders. Other interpersonal skills useful in managing stakeholder engagement are building trust, active listening and overcoming resistance to change. [Executing]

PMI®, *PMBOK® Guide*, 2013, 407–408

25. b. Change log

Projects involve change, and most everyone tends to resist it. A change log is useful to review in the control stakeholder engagement process. Other useful documents are the schedule, stakeholder register, issue log, and project communications. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 412–413

26. a. Use a focus group

The key word in the question was experts. Useful ways to obtain information from experts is to use a survey, such as a Delphi approach, or to use a focus group, an excellent approach to obtain insight into attitudes, useful to control stakeholder engagement. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 412–413

27. b. Leads the project through initiating until it is formally authorized

The sponsor is critical throughout the project. He or she provides resources for the project and is accountable for its success. From the beginning through closure, the sponsor promotes the project. [Initiating, Planning, Executing, and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 32

28. b. Offer to include the operational managers in all project phases

The needs of operations managers who perform and conduct business operations are important considerations in projects that affect their future work and endeavors. They should be engaged, and their needs identified in the stakeholder register. By considering them and appropriately including them in all project phases, the project manager can gain insight and avoid unnecessary issues that may arise if their input is overlooked. [Initiating, Planning, Executing, and Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 13

29. c. Lessons learned

Lessons learned, stakeholder register templates, and stakeholder registers from previous projects are examples of organizational process assets that can influence the identify stakeholders process. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 395

30. b. Hold profile analysis meetings

A profile analysis meeting is a tool and technique in the identify stakeholders process. Its purpose is to develop a deeper understanding of major project stakeholders. The meetings can be used to exchange and analyze information about roles, interests, knowledge, and the overall position of each stakeholder about the project. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 398

31. c. Potential influence in the project

The stakeholder register contains assessment information as a key component. The assessment information includes: major requirements, main expectations, potential influence in the project, and the phase in the project life cycle with the most interest.

[Initiating]

PMI®, *PMBOK® Guide*, 2013, 398

32. d. Contains a change management plan and documents how changes will be monitored and controlled

Among other key items useful in the project management plan to review while preparing the stakeholder management plan is the change management plan.

All projects involve some type of change. Reviewing this plan can help the project manager work with stakeholders who may be resistant to the project to help turn them into ones who are supportive or at least neutral to the resulting changes. [Planning]

PMI®, *PMBOK® Guide*, 2013, 400

33. a. The project manager to prepare the stakeholder management plan

The stakeholder engagement assessment matrix shows the stakeholders current engagement in the project, and the project manager and team then can use it to note the desired level of engagement. As a tool and technique in plan stakeholder management, the project manager then uses it to help prepare the stakeholder management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 402–403

34. d. Highest in the very early stages as the project is being approved and initiated

The stakeholders' ability to influence the project is highest during the initial phases and gets progressively lower as the project progresses. Active management of stakeholders' involvement decreases the risk of the project failing to meet its goals and objectives [Executing]

PMI®, *PMBOK® Guide*, 2013, 406

35. c. Sets forth an escalation process

Among other things, an escalation process is helpful especially if there are issues or risks involving communications that the project manager wishes to escalate to determine the most appropriate response or to share the approach he or she plans to follow. [Executing]

PMI®, *PMBOK® Guide*, 2013, 406

36. b. Project schedule

Project documents are an input to control stakeholder engagement. They originate from initiating, planning, executing, or controlling processes and include the project schedule, stakeholder register, issue log, change log, and project communications. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 411–412

37. d. Update the lessons learned documentation

This documentation is an example of an organizational process asset to update as it includes the root cause analysis of issues faced, the reasons certain corrective actions were taken, and other types of lessons learned about stakeholder management. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 415

38. c. Stakeholder management plan

The stakeholder management plan identifies the management strategies required to effectively engage stakeholders. It includes, among other things, the identified interrelationships and potential overlap between stakeholders. This information is invaluable especially if some stakeholders are resistant or negative to the project and also in determining the level of frequency of desired interaction and communications requirements. [Planning]

PMI®, *PMBOK® Guide*, 2013, 403

39. b. Historical information

Historical information about previous projects, organizational communications requirements, issue management procedures, and change control procedures are examples of organizational process assets that can influence the manage stakeholder engagement process. [Executing]

PMI®, *PMBOK® Guide*, 2013, 407

40. c. Tools and techniques used in control stakeholder engagement

In control stakeholder engagement, they are examples of distribution formats from information management systems, a tool and technique in this process. Such systems provide a structured tool for the project manager to capture, store, and distribute information to stakeholders about project cost, schedule progress, and performance. The project manager can use these systems to consolidate reports from several systems and facilitate report distribution. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 412

Practice Test

This practice test is designed to simulate PMI®'s 200-question PMP® certification exam.

INSTRUCTIONS: Note the most suitable answer for each multiple-choice question in the appropriate space on the answer sheet.

1. You recently took over a relatively new project expected to last another seven years. The previous project manager completed most of the WBS. When you begin to define the project activities, you realize that the WBS work packages expected to occur in the next year are planned in detail, but the work packages for later in the future (three years or more) are not planned with much detail, if any detail at all. You determine—
 - a. It is a major problem. The WBS is incomplete and you need to redefine the project scope to complete the project schedule.
 - b. It is a problem that must be resolved quickly. The previous project manager was not done with the WBS, and you must stop the project to complete the WBS in sufficient detail.
 - c. It is not a problem at this time. The previous project manager was using the rolling wave planning technique, so you are able to continue defining the activities.
 - d. It is not a problem at this time. You can only plan what you know. You plan to communicate to the project sponsor that the WBS is not sufficient to plan the whole project and that the sponsor can worry about the details.
2. In the initial stage of the project life cycle, the project's technical objectives are apt to be understood only in a general sense. A major component of project conflict during this stage of the project is—
 - a. Concerns over priorities and procedures
 - b. Concerns about technical issues
 - c. Schedules
 - d. Confusion of establishing a project in the matrix management environment

3. On your project to construct a new runway for your City's airport, you are in the process of selecting vendors for various parts of this project. You have conducted your make-or-buy analysis and have issued Requests for Proposals. You believe it is important to examine past performance of potential vendors. This means you are using—
 - a. Proposal evaluation techniques
 - b. Multi-disciplinary review teams
 - c. Analytical techniques
 - d. Independent estimates
4. Requirements typically are classified into product requirements and project requirements. Capturing and managing both types of requirements is important for project success, so you and your team decided to follow this classification system on your project to modernize all the telecommunications equipment in your company. During such an approach, all the following are examples of product requirements EXCEPT—
 - a. Action requirements
 - b. Level of service requirements
 - c. Security requirements
 - d. Performance requirements
5. Change control procedures, configuration management knowledge base, versions, and baselines in the develop project management plan process are:
 - a. Enterprise environmental factors
 - b. Organizational process assets
 - c. Part of the project's configuration management plan, which as a subsidiary plan will be part of the project management plan
 - d. Part of the organization's management practices

6. You are managing a project that has five subcontractors. You must monitor contract performance, make payments, and manage provider interface. One subcontractor submitted a change request to expand the scope of its work. You decided to award a contract modification based on a review of this request. All these activities are part of—
 - a. Control procurements
 - b. Conduct procurements
 - c. Form contract
 - d. Configuration management
7. Although the project charter serves to state the project manager's authority and responsibility on the project, the project manager further requires which type of power in order to be an effective leader?
 - a. Expert
 - b. Legitimate
 - c. Position
 - d. Referent
8. The performance measurement baseline consists of all the following EXCEPT—
 - a. Scope baseline
 - b. Requirements baseline
 - c. Schedule baseline
 - d. Cost baseline

9. While working as the project manager on a new project to improve overall ease of use in the development of a railroad switching station, you have decided to add a subject matter expert who specializes in ergonomics to your team. She has decided to observe the existing approach as you and your team work to define requirements for the new system. This method is also called—
- a. Mentoring
 - b. Coaching
 - c. Job shadowing
 - d. User experimentation
10. In addition to providing support to the project, quality assurance also provides an umbrella for—
- a. Plan-do-check-act
 - b. Continuous process improvement
 - c. Project management maturity
 - d. Work performance information
11. As you manage the railroad switching station project, you are concerned that the business analyst who was responsible for preparing the WBS may have overlooked some parts of the project. In order to see if the WBS requires enhancements you decide to—
- a. Perform a cause-and-effect diagram
 - b. Meet with your sponsor
 - c. Use an affinity diagram
 - d. Review the accompanying WBS Dictionary with a member of the PMO

12. Assume that your company is working under a fixed-price-incentive contract. It has a target cost of \$100,000, a target profit of 10%, a price ceiling of \$120,000, and a share formula of 80/20. Assume that your company completes all of the work but has actual costs of \$110,000. What is the final value of this procurement?
- a. \$120,000
 - b. \$132,000
 - c. \$118,000
 - d. \$110,000
13. If you apply the configuration management system along with change control processes project wide, you will achieve all but one of the which following objectives?
- a. Provide the basis for which the product configuration is defining
 - b. List the approved configuration identification
 - c. Document the specific responsibilities of each stakeholder in the perform integrated change control process
 - d. Ensure the composition of a project's configuration items is correct
14. You need to outsource the testing function of your project. Your subcontracts department informed you that the following document must be prepared before conducting the procurement:
- a. Make-or-buy analysis
 - b. Procurement management plan
 - c. Evaluation methodology
 - d. Contract terms and conditions

15. Constraints common to projects include—
- Scope, quality, schedule, budget, and risk
 - Scope, teaming, planning, and resources
 - Scope
 - Resources and communication
16. You are developing a project charter and want to ensure that any changes that may occur after the project begins will be controlled rigorously. You have consulted your company's configuration management knowledge base, and it contains versions and baselines of all the following official company documents EXCEPT—
- Standards
 - Strategic plans
 - Policies
 - Procedures
17. To identify inefficient and ineffective policies, processes, and procedures in use on a project, you should conduct—
- An inspection
 - A process analysis
 - Benchmarking
 - A quality audit
18. Your project management office implemented a project management methodology that emphasizes the importance of integrated change control. It states that change requests can occur in all the following forms EXCEPT—
- Indirect
 - Legally mandated
 - Informal
 - Internally initiated

19. Configuration management describes procedures for applying technical and administrative direction and surveillance. Which one of the following tasks is NOT performed in configuration management?
 - a. Identifying functional and physical characteristics of an item or system
 - b. Controlling changes to characteristics
 - c. Performing an audit to verify conformance to requirements
 - d. Allowing automatic approval of changes

20. A number of tools and techniques are helpful in the perform integrated change control process. If you want to implement an integrated change control process, you should use—
 - a. Configuration management software
 - b. A project management information system
 - c. Project status review meetings
 - d. Change control meetings

21. Having worked previously as a software project manager, you were pleased to be appointed as the project manager for a new systems integration project designed to replace the existing air traffic control system in your country. You found a requirements traceability matrix to be helpful on software projects, so you decided to use it on this systems integration project. Using such a matrix helps to ensure that each requirement—
- a. Adds quality and supports the organization's quality policy
 - b. Adds business value as it links to business and project objectives
 - c. Sets forth the level of service, performance, safety, security, and compliance
 - d. Shows the impact to other organizational areas and to entities outside of the performing organization
22. During the closing phase of the project, the top-ranked source of conflict is—
- a. Schedule
 - b. Administrative procedures
 - c. Cost
 - d. Human resources
23. Which of the following ensures that requested changes to deliverables are thoroughly considered as part of the perform integrated change control process?
- a. Scope change control system
 - b. Configuration management system
 - c. Change control board
 - d. Configuration status audits

24. Which of the following tools is used in process analysis to determine the underlying causes of defects?
 - a. Root cause analysis
 - b. Assumptions analysis
 - c. Cost-benefit analysis
 - d. Quality metrics

25. All of the following statements concerning validate scope and control quality are true EXCEPT—
 - a. The processes can be performed in parallel
 - b. Both processes use inspection as a tool and technique
 - c. Validate scope is concerned with the acceptance of deliverables, and control quality is concerned with meeting quality requirements for the deliverables
 - d. Validate scope verification typically precedes control quality

26. Consider a company that sells products to consumers: as one product begins the deterioration and death phases of its life cycle (or the divestment phase of a system), new products or projects must be established. This means that—
 - a. The company requires a continuous stream of projects to survive
 - b. The company is not at a high level of maturity
 - c. The company is in a period of overall decline
 - d. The company definitely lacks a balanced portfolio

27. You are in the process of performing quality assurance on your product and find that some requirements are not as complete as they should be, which causes rework and adds costs to your overall project. The term for all costs incurred over the life of the product by investing in appraising and inspecting the product for conformance and nonconformance to requirements is called—
- a. Life-cycle costs
 - b. Expected value
 - c. Cost of conformance
 - d. Cost of quality
28. The project scope baseline should be used in the identify risks process because it—
- a. Identifies project assumptions
 - b. Identifies all work that must be done; therefore, it includes all risks on the project
 - c. Helps organize all work that must be done on the project
 - d. Contains information on risks from prior projects
29. Although there are various tools and techniques to consider as you collect requirements on your project, one approach that supports the concept of progressive elaboration is—
- a. Idea/mind mapping
 - b. Affinity diagrams
 - c. Prototypes
 - d. Joint Application Design® sessions

30. Tools and techniques used to perform quality assurance include—
 - a. Tools from control quality and plan quality management
 - b. Tools from performance reporting
 - c. Variance analysis
 - d. Direct and manage project execution
31. An approach to provide insight into the health of the project and to identify any areas that require special attention is to—
 - a. Conduct periodic status reviews
 - b. Prepare regular status and progress reports
 - c. Prepare forecasts of the project's future
 - d. Continuously monitor the project
32. Although your company's project life cycle does not mandate when a project review should be conducted, you believe it is important to review performance at the conclusion of each phase. The objective of such a review is to—
 - a. Determine how many resources are required to complete the project according to the project baseline
 - b. Adjust the schedule and cost baselines based on past performance
 - c. Obtain customer acceptance of project deliverables
 - d. Determine whether the project should continue to the next phase

33. The key management skills required during the adjourning stage of team development include all but which one of the following?
- a. Evaluating
 - b. Reviewing
 - c. Celebrating
 - d. Improving
34. Assume that your actual costs are \$1,000; your planned value is \$1,200; and your earned value is \$1,500. Based on these data, what can be determined regarding your schedule variance?
- a. At $-\$300$, the physical progress is being accomplished at a slower rate than is planned, indicating an unfavorable situation.
 - b. At $+\$300$, the situation is favorable, as physical progress is being accomplished ahead of your plan.
 - c. At $+\$500$, the situation is favorable, as physical progress is being accomplished at a lower cost than was forecasted.
 - d. At $-\$300$, you have a behind-schedule condition, and your critical path has slipped.
35. The key to effective cost control is—
- a. Using earned value to forecast project status
 - b. Focusing on projected expenditures and actively networking with key stakeholders to ensure funds will be available as requested
 - c. Informing stakeholders of the project's cost status
 - d. Managing the approved cost baseline and any changes to it

36. The CPI on your project is 0.44, which means that you should—
- a. Place emphasis on improving the timeliness of the physical progress
 - b. Reassess the life-cycle costs of your product, including the length of the life-cycle phase
 - c. Place emphasis on improving the productivity by which work was being performed
 - d. Recognize that your original estimates were fundamentally flawed, and your project is in an atypical situation
37. Project deliverables are the outputs that include the product, service, or result of the project as well as ancillary results. These ancillary results should be in the—
- a. Requirements management plan
 - b. Scope management plan
 - c. Project scope statement
 - d. Project acceptance criteria
38. Which of the following tools and techniques is used in the close project or phase process?
- a. Project management methodology
 - b. Work performance information
 - c. Expert judgment
 - d. Project management information system
39. After the project scope statement is complete, it may be necessary to update other project documents. All the following are examples of a document that may require updates EXCEPT—
- a. Project charter
 - b. Stakeholder register
 - c. Requirements documentation
 - d. Requirements traceability matrix

40. A challenge of earned value management is predicting percent complete. The simplest formula to use to calculate EV is—
- a. 0/100 rule
 - b. 50/50 rule
 - c. $(\text{Percent complete}) \times (\text{budget at completion})$
 - d. Milestone method
41. While managing a large project in your organization, you realize that your project team requires training in contract administration because you will be awarding several major subcontracts. After you analyze your project requirements and assess the expertise of your team members, you decide that your team will need a one-week class in contract administration. This training should—
- a. Commence as scheduled and stated in the staffing management plan
 - b. Commence as scheduled and stated as part of the procurement management plan
 - c. Be scheduled if necessary after performance assessments are prepared and after each team member has had an opportunity to serve in the contract administrator role
 - d. Commence as scheduled and stated in the team development plan
42. Assume that on your project, you are using earned value management. Your project is one that has extremely long work packages. Therefore, the method you should use to calculate EV is—
- a. 0/100 rule
 - b. Milestone method
 - c. Equivalent effort
 - d. Apportioned effort

43. Your project sponsor has asked you, “What do we now expect the total job to cost?” Given that you are using earned value, you should calculate the—
- a. To-complete performance index
 - b. Estimate to complete
 - c. Estimate at completion
 - d. Budget at completion
44. One key reason that the develop project charter process is so important is that it—
- a. Documents the boundaries of the project
 - b. States the methods for acceptance of the project's deliverables
 - c. Describes the project's characteristics
 - d. Links the project to the ongoing work of the organization
45. Your company has been awarded a contract for project management consulting services for a major government agency. You were a member of the proposal writing team, are PMP® certified, and you are the project manager. You are now working to prepare your project management plan, which is to be submitted in one week. You decided to use some facilitation techniques to help develop your plan. While a number are possible, you selected—
- a. Conflict resolution
 - b. Checklist analysis
 - c. SWOT analysis
 - d. Assumptions analysis

46. Assume you had a phase gate meeting with your Governance Board for your project to develop the next generation radar system as part of the nation's airspace modernization program. At this meeting, the Board approved your project management plan. However, as you begin to execute your plan, an organizational process asset to consider is—
- Stakeholder risk tolerances
 - The organization's culture
 - Hiring and firing guidelines
 - Process measurement data base
47. Consider the data in the table below. Assume that your project consists only of these three activities. Your estimate at completion is \$4,400.00. This means you are calculating your EAC by using which of the following formulas?

Activity	% Complete	PV	EV	AC
A	100	2,000	2,000	2,200
B	50	1,000	500	700
C	0	1,000	0	0

- $EAC = AC/EV \times BAC$
- $EAC = AC/EV \times [\text{work completed and in progress}] + [\text{actual (or revised) cost of work packages that have not started}]$
- $EAC = [\text{Actual to date}] + [\text{all remaining work to be done at the planned cost including remaining work in progress}]$
- $EAC = \% \text{ complete} \times BAC$

48. Rolling wave planning in the create WBS process refers to situations in which—
 - a. Certain deliverables or subprojects will be accomplished far into the future
 - b. Additional work is added to the project after the scope baseline has been established; therefore, additional decomposition is required
 - c. Identification codes for the WBS elements cannot be determined until the schedule activity list is complete in case revisions are required
 - d. Subprojects are developed by external organizations and then become part of the WBS for the entire project

49. The lessons learned documentation is an output from the—
 - a. Identify stakeholders process
 - b. Develop project management plan process
 - c. Manage communications process
 - d. Plan communications management process

50. Your experience has taught you that inappropriate responses to cost variances can produce quality or schedule problems or unacceptable project risk. When leading a team meeting to discuss the importance of cost control, you note that cost control is concerned with—
 - a. Influencing the factors that create change to the authorized cost baseline
 - b. Developing an approximation of the costs of the resources needed to complete the project
 - c. Allocating the overall cost estimate to individual work items
 - d. Establishing a cost performance baseline

51. You are pleased to be the project manager for a new video conferencing system for your global organization. You want it to be one that is easy to use and is state of the art. As the project manager, you also are the project leader. You realize leadership is critical throughout the phases of the project and its key elements are—
- a. Respect and trust
 - b. Political and cultural awareness
 - c. Negotiation and influencing
 - d. Decision making and conflict management
52. The WBS represents all product and project work, including project management. It is sometimes called the—
- a. Control account level
 - b. 100% rule
 - c. Integration of scope, cost, and schedule for comparison to the earned value
 - d. The code of accounts

53. Your company is in the project management training business. In addition, the company publishes several exam study aids for the PMP® and CAPM® exam. You have your PMP®, and you have been appointed as the project manager to make sure your company's training materials are updated to be aligned with the new *PMBOK® Guide*. You must complete your project in six months. You are now in month four. Many of your team members have been working on other projects as the company uses matrix management. In a performance review meeting today, you informed your Governance Board that you did not think you could complete this project in the remaining two months. You were informed that additional resources were not available, but you had to complete your project on time. Your best course of action is to—

- a. Revise your schedule baseline
- b. Use fast tracking
- c. Adjust leads and lags now in your schedule
- d. Use modeling techniques

54. You are trying to determine whether or not to conduct 100% final system tests of 500 ground-based radar units at the factory. The historical radar field failure rate is 4%; the cost to test each unit in the factory is \$10,000; the cost to reassemble each passed unit after the factory test is \$2,000; the cost to repair and reassemble each failed unit after factory test is \$23,000; and the cost to repair and reinstall each failed unit in the field is \$350,000. Using decision tree analysis, what is the expected value if you decide to conduct these tests?

- a. \$5.5 million
- b. \$5.96 million
- c. \$6.42 million
- d. \$7 million

55. Motivation is dynamic and complex. The statement, “Motivation is an intrinsic phenomenon. Extrinsic satisfaction only leads to movements, not motivation” is attributed to which of the leading theories of motivation?
- a. Maslow’s Hierarchy of Needs Theory
 - b. Herzberg’s Motivator-Hygiene Theory
 - c. Morse and Lorsch’s Contingency Theory
 - d. McGregor’s Theory X/Theory Y
56. Each time you meet with your project sponsor, she emphasizes the need for cost control. To address her concerns, you should provide—
- a. Work performance information
 - b. Cost baseline updates
 - c. Resource productivity analyses
 - d. Trend analysis statistics
57. One output of the control costs process is cost forecasts, which is when—
- a. Modifications are made to the cost information used to manage the project and are communicated to stakeholders
 - b. Trend analyses are performed and communicated to stakeholders
 - c. A budget update is required and communicated to all stakeholders
 - d. A calculated EAC value or a bottom-up EAC value is documented and communicated to stakeholders

58. You work for an electrical utility company and will be managing a project to build a new substation that will serve a new industrial park. This project was authorized because of a—
- a. Business need
 - b. Market demand
 - c. Technological advance
 - d. Customer request
59. A final project report is a recommended best practice. Although this report can be organized in a variety of ways, how should each item that is covered in the report be addressed?
- a. A recommendation for changing current practice should be made and defended.
 - b. The focus should be solely on items that did not work well on the project.
 - c. Individuals who did not contribute successfully as team members should be noted.
 - d. An earned value discussion is warranted.
60. At the time the risk register is first prepared, it should contain all the following entries EXCEPT—
- a. Root causes of risk
 - b. Structure for describing risks
 - c. List of risks requiring near-term responses
 - d. List of potential responses

61. Which of the following theorists stated that people generally are motivated according to the strength of their desire either to achieve high levels of performance or to exceed in competitive situations?
- a. David McGregor
 - b. David McClelland
 - c. Victor Vroom
 - d. B. F. Skinner
62. Your project is considered very risky. You plan to perform numerous what-if scenarios on your schedule using simulation software that will define each schedule activity and calculate a range of possible durations for each activity. The simulation then will use the collected data from each activity to calculate a distribution curve (or range) for the possible outcomes of the total project. Your planned approach is an example of which following technique?
- a. PERT
 - b. Monte Carlo analysis
 - c. Linear programming
 - d. Concurrent engineering
63. Project execution must be compared, and deviations must be measured for management control according to the—
- a. Scope baseline
 - b. Performance measurement baseline
 - c. Schedule baseline
 - d. Control system

64. A number of items may be part of the schedule data for the project. The amount of additional detail will vary, but the data should include all the following items EXCEPT—
 - a. Schedule activities
 - b. Activity attributes
 - c. Identified assumptions
 - d. Resource breakdown structure
65. If a team member, when facing schedule delays and cost overruns, develops several alternatives for completing the project successfully on schedule and within budget and asks questions such as, “Can we do it?” “If we do it what are the consequences?” and “Is it really worth the effort involved?” he or she is primarily motivated by the—
 - a. Contingency Theory
 - b. Expectancy Theory
 - c. Reinforcement Theory
 - d. Equity Theory
66. Which tool or technique is NOT used for schedule control?
 - a. Performance reviews
 - b. Project management software
 - c. Work performance information
 - d. Leads and lags
67. All the following are examples of project document updates from the manage project team process EXCEPT—
 - a. Issue log
 - b. Roles description
 - c. Project staff assignments
 - d. Personnel skills

68. Recording and reporting information regarding when appropriate configuration information should be provided and regarding the status of proposed and approved changes effectively is done through—
- a. Configuration status accounting
 - b. Configuration verification and audit
 - c. Project management methodology
 - d. A project management information system (PMIS)
69. Decomposition is a technique used to break larger, complex items into smaller and more manageable items. Which following statement best describes the role decomposition plays in creating the WBS?
- a. Final output of creating the WBS is described in terms of phases of a project life cycle.
 - b. Final output of creating the WBS is described in terms of schedule activities.
 - c. Final output of creating the WBS is described in terms of verifiable products, services, or results.
 - d. Final output of creating the WBS is described in terms of the scope of the project.
70. The schedule management plan is a key document. It is—
- a. An output of the develop schedule process
 - b. A tool and technique used in the develop schedule process
 - c. The first time management process
 - d. A separate planning effort completed in conjunction with the time management processes

71. Activity attributes are used to extend the description of the activity and to identify its multiple components. In the early stages of the project, an example of an activity attribute is—
- a. Activity codes
 - b. Activity description
 - c. Predecessor and successor activities
 - d. Activity name
72. You are working on a new project in your city to construct an environmentally friendly landfill. The existing site is so undesirable that many residents have moved to other neighboring cities because of their proximity to it. However, even though the project has the support of the public, you need to have a number of hearings of the city's government before you are authorized to begin work. As you are in the planning phase of the project, you are waiting for these hearings to be scheduled and held before you can begin site preparation. These hearings are an example of—
- a. A milestone
 - b. An external dependency
 - c. An item to be scheduled as a fragnet
 - d. A mandatory dependency
73. You are working on a project and want to know how many activities in the previous month were completed with significant variances. You should use a(n)—
- a. Control chart
 - b. Inspection
 - c. Scatter diagram
 - d. Trend analysis

74. Your project has a budget of \$1.5 million for the first year, \$3 million for the second year, \$2.2 million for the third year, and \$800,000 for the fourth year. Most of the project budget will be spent during—
- a. Starting the project
 - b. Organizing and preparing
 - c. Carrying out the work
 - d. Closing the project
75. If you decide to follow an open subordination approach to resolving conflict, you are using which style of conflict resolution?
- a. Avoiding
 - b. Accommodating
 - c. Compromising
 - d. Collaborating
76. Typically, the seller receives formal written notice that the contract has been completed by the—
- a. Project manager
 - b. Authorized procurement administrator
 - c. Member of the project management team responsible for daily contract administration
 - d. Purchasing department head
77. Working in the control procurements process since your project is using five contractors, you need to update a number of organizational process assets. An example is—
- a. Procurement management plan
 - b. Procurement documentation
 - c. Correspondence
 - d. Warranties

78. You are beginning a new project staffed with a virtual team located across five different countries. To help limit conflict and misunderstandings concerning the justification, objectives, and high-level requirements of the project among your team members and their functional managers, you ask the project sponsor to prepare a—
- a. Memo to team members informing them that they work for you now
 - b. Project charter
 - c. Memo to functional managers informing them that you have authority to direct their employees
 - d. Human resource management plan
79. To anticipate and help develop approaches to deal with potential quality problems on your project, you want to use a variety of root-cause analysis techniques including all the following approaches EXCEPT—
- a. Fishbone diagrams
 - b. Ishikawa diagrams
 - c. System or process flowcharts
 - d. Checklists
80. All of the following are examples of ways to generate options for mutual gain during negotiations EXCEPT—
- a. Separating inventing from deciding
 - b. Options broadening
 - c. Zero-sum game analysis
 - d. Multiplying options by shuttling between the specific and the general

81. Recently, your company introduced a new processing system for its products. You were the project manager for this system and now have been asked to lead a team to implement needed changes to increase efficiency and productivity. To help you analyze the process outputs, you and your team have decided to use which following technique?
- a. System flowcharts
 - b. Design of experiments
 - c. Pareto analysis
 - d. Control charts
82. Effective leadership is one key to successful project management. There are several theories of leadership. One model is Hershey and Blanchard's situational leadership model that describes directive behavior and supportive behavior. Of the following, which one is NOT a key word for supportive behavior?
- a. Listen
 - b. Structure
 - c. Praise
 - d. Facilitate
83. Based on quality control measurements on your manufacturing project, management realizes that immediate corrective action is required to the material requirements planning (MRP) system to minimize rework. To implement the necessary changes you should follow—
- a. The organization's quality policy
 - b. The quality management plan
 - c. Established operational definitions and procedures
 - d. A defined integrated change control process

84. You are the project manager on a project to improve traffic flow in the company's parking garage. You decide to use flowcharting to—
- Help anticipate how problems occur
 - Show dependencies between tasks
 - Show the results of a process
 - Forecast future outcomes
85. Successful project management involves both project leadership as well as project management skills. Several different leadership styles are appropriate in different phases of the project life cycle. Assume that you are working on a project, and it is in the execution phase. The leadership style that is most appropriate should consist of a blend of all but which one of the following?
- Change master
 - Decision maker
 - Team and synergy
 - Trustworthiness
86. Schedule control is one important way to avoid delays. While planning and executing schedule recovery, one tool available to you for control schedules is—
- Changing the schedule management plan
 - Immediately rebaselining
 - Adjusting leads and lags
 - Changing all project and resource calendars

87. You have been the project manager for your nuclear submarine project for four years. While you did not assume this position until the project management plan had been prepared and approved, you find you spend a significant amount of time collecting data and communicating. You also spend time reviewing the impact of project changes and implementing ones that have been approved. Often you have had to modify a non-conforming product, which means you are spending time on—

- a. Corrective actions
- b. Updating the project's requirements
- c. Updating the traceability matrix
- d. Defect repair

88. You were assigned recently as the project manager of a program management office project to implement a new enterprise-wide scheduling system for use throughout your company. You identify the need for a project charter to provide you with appropriate authority for applying resources, completing the project work, and formally initiating the project. Who should issue the project charter?

- a. The project manager—you
- b. The customer
- c. The person who formally authorizes the project
- d. A member of the training and development department as they will own the training on the new system

89. In which of the following methods of resolving conflict will the conflict typically reappear again in another form?

- a. Smoothing
- b. Compromising
- c. Collaborating
- d. Confronting

90. Statistical sampling is a method in perform quality control to determine the conformance to requirements for some component or product of a project. Its greatest advantage is that it—
 - a. Does not require a large expenditure of resources
 - b. Is accurate enough with a sampling of less than 1%
 - c. Does not require 100% inspection of the components to achieve a satisfactory inference of the population
 - d. Needs to be conducted only when a problem is discovered with the end product or when the customer has some rejects
91. Your project sponsor wants to know whether process variables are within acceptable limits. To answer this question, you should—
 - a. Conduct a process analysis
 - b. Conduct a root cause analysis
 - c. Use a control chart
 - d. Use a run chart
92. All the following statements are true about the grassroots estimate, EXCEPT—
 - a. Its accuracy rate is from –5% to +10%
 - b. It is also called an engineering estimate
 - c. It is used primarily for Level 1 of the WBS
 - d. It may take months to prepare

93. You are planning a project and want to account for how the project will be managed in the future. While building your cost performance data, you want to provide guidance for when the project is later executed, because you know that different responses are required depending upon the degree of variance from the baseline. For example, a variance of 10 percent might not require immediate action, whereas a variance of 20 percent will require more immediate action and investigation. You decide to include the details of how to manage the cost variances as part of which following plan?
- a. Cost management plan
 - b. Change management plan
 - c. Performance measurement plan
 - d. Variance management plan
94. Assume that you are managing a project team. Your team is one in which its members confront issues rather than people, establish procedures collectively, and is team oriented. As the project manager, which of the following represents your team's stage of development and the approach you should use during this time?
- a. Storming; high directive and supportive approach
 - b. Norming; high directive and low supportive approach
 - c. Norming; high supportive and low directive approach
 - d. Performing; low directive and supportive approach

95. You are finalizing all the contracts and ensuring that they are closed. The close procurements process involves all the following administrative actions EXCEPT—
- a. The procurement administrator is reassigned
 - b. Finalizing open claims
 - c. Updating the project records to show the final contract results
 - d. Archiving the contracts and contract records for future use
96. You are working on a project and want to identify the cause of problems in a process by the shape and width of the distribution of the process variables. You should use a—
- a. Histogram
 - b. Pareto chart
 - c. Scatter diagram
 - d. Trend analysis

97. You are working on a construction project in a city different from your headquarters' location. You and your team have not worked in this city, City B, previously, and you lack knowledge of the local building codes. You had a team member review the codes, and he said they were in far greater detail than those in your city, City A. When you asked him how much time he would need to spend to gain a complete understanding of these codes, he estimated that at least five weeks would be needed. You then decided it would be more cost effective to hire a local person from City B who specializes in this area. As a result, as you prepare your schedule and estimate your resource requirements for this project, you should coordinate this work closely with which of the following processes:
- a. Estimate costs
 - b. Define activities
 - c. Determine budgets
 - d. Develop schedule
98. Assume that you were the first person in your company to be PMP® certified and also that you earned a doctorate in project management. People throughout the organization admired your achievements. Based on your success in managing projects, your company now has adopted a management-by-projects philosophy. You have been appointed head of your company's project management office to lead the organization as it transitions to this new way of working. So far, people seem to willingly comply with your demands and requests. In this situation, you are using which type of power?
- a. Legitimate
 - b. Expert
 - c. Contacts
 - d. Referent

99. The nature of project work is such that it inevitably causes stress. Project managers thus need to learn how to cope with and manage stress and understand what stress is and why it is created. Project managers need to note that it can be a positive experience depending on how people perceive stress and should work to mentor team members accordingly. As you strive to become more aware of stress, which one of the following is NOT considered a stress-creating factor that is related to the project environment?
- a. Role ambiguity
 - b. Corporate politics
 - c. Career development
 - d. Selection of team members
100. Assume you are working as the project manager on the first project in your company to use the critical chain approach to scheduling. You are a PMP® and also are certified in critical chain. You are getting ready for a performance review with your Governance Board, and you can expect they will ask questions about—
- a. The magnitude of variance against the schedule baseline
 - b. Schedule risk
 - c. Performance to date since the past review meeting
 - d. The buffer needed and buffer remaining

101. You are in the early stages of a project to manufacture disposable medical devices. You need a number of engineers including ones with specialties in mechanical, environmental, and systems engineering. In the early stages of this project, your resource pool includes a large number of both junior and senior engineers in the various specialty areas. However, as the project progresses—
- a. Fewer systems engineers will be needed
 - b. The resource pool can be limited to those people who are knowledgeable about the project
 - c. To complete the project on time, you will continue to require access to a large number of engineers in their specialty areas
 - d. You will only need junior level engineers as the senior level people can be used early in the project to mentor and train them
102. A number of approaches can be helpful when estimating resource requirements for activities on a project. Assume you are managing a project and you have already prepared your WBS. When you decomposed your WBS, it has 45 work packages. You then prepared an activity list. Now, you are preparing your schedule and determining your resource requirements. You found there were about 30 activities that you could not estimate with a reasonable degree of confidence, so you and your team decided to use which one of the following approaches to help with these activity resource estimates:
- a. Resource breakdown structure
 - b. Published estimating data
 - c. Alternatives analysis
 - d. Bottom-up estimating

103. To practice effective schedule control, your project team must be alert to any issues that may cause problems in the future. To best accomplish effective schedule control, the team should—
- Review work performance information
 - Allow no changes to the schedule
 - Update the schedule management plan on a continuous basis
 - Hold status reviews
104. Functional managers play a vital role in ensuring project success. Since most projects operate in a matrix environment, there is shared authority between project managers and functional managers. Functional managers tend to focus on—
- Who will do the task
 - Why the project manager needs resources
 - How much time and money is available for the task
 - Why will the task be done
105. You are a member of a project selection committee that uses the net present value technique. Using this approach, the project is acceptable if the—
- Sum of the net present value of all estimated cash flow during the life of the project equals the profit
 - Net present value of the inflow is greater than the specified amount or percentage threshold
 - Gross present value of all future expected cash flow divided by the initial cash investment is greater than one
 - Net present value of the inflow is less than the specified amount or percentage threshold

106. A watch list of low priority risks is documented in the—
- Work performance information
 - Risk register
 - Fallback plans
 - Risk response plan
107. You are the project manager for a major logistics installation project and must obtain specific services from local sources external to your project. Your subcontracts administrator has told you to prepare a product or service description, which is referenced in a—
- Project statement of work
 - Contract scope statement
 - Request for proposal
 - Contract
108. It often is advantageous to appoint a termination manager in the closing phase of the project and release the project manager so that he or she is available to work on another project. If this is the case, the termination manager should focus attention on all but which one of the following?
- Ensuring that documentation is complete
 - Ascertaining any product support requirements
 - Receiving formal acceptance of the project from the client
 - Preparing personnel performance evaluations

109. You are working on a project to upgrade the existing fiber-optic cables in your province. You have determined that a resource can install 25 meters of cable per hour, so the duration required to install 1,000 meters would be 40 hours. This means you are using—
 - a. Productivity efficiency factors
 - b. Parametric estimating
 - c. Analogous estimating
 - d. PERT
110. During the stages of team development, your team is in which stage when there is problem solving and interdependence along with achievement and synergy?
 - a. Storming
 - b. Forming
 - c. Norming
 - d. Performing
111. When you are about to terminate a contract, the one place to look for specific procedures for contract closure is in the—
 - a. Statement of work in the contract
 - b. Terms and conditions in the contract
 - c. Product description
 - d. Organizational process assets
112. Today, the primary cause of why projects are not completed on time and within cost and are terminated early is due to—
 - a. Contractual issues
 - b. Complexity of the project
 - c. An increase in the allocated time
 - d. Behavioral-oriented reasons

113. Life-cycle phase definitions are different in different industries. For example, all of the following are terms that could be used in the closing phase of a project EXCEPT—
- a. Testing and commissioning
 - b. Conversion
 - c. Implementation
 - d. Final audit
114. Your company is embarking on a project to launch a new product delivery service. You are the project manager for this project and have just finished the concept phase. The various outputs/deliverable(s) for this phase include—
- a. Project management plan
 - b. Scope of work and requirements
 - c. Project charter and stakeholder register
 - d. Roles and responsibilities of the project manager
115. Behavior roles of team members influence the team's process, behavior, and effectiveness. An example of a task-oriented role to perform is that of a(n)—
- a. Harmonizer
 - b. Initiator
 - c. Devil's advocate
 - d. Group observer

116. You are managing a project in which your team members all work in the same geographic location and have worked together previously on many projects. Everyone is aware of the various strengths and weaknesses of the individual team members and their key areas of expertise. As a result—
- a. A kickoff meeting is recommended
 - b. Team-building activities will not be needed on your project
 - c. You should expect minimal conflicts and changes to occur
 - d. Rewards and recognition will be handled smoothly throughout the project
117. Team building should be ongoing throughout the project life cycle. However, it is hard to maintain momentum and morale, especially on large, complex projects that span several years. One guideline to follow to promote team building is to—
- a. Consider every meeting a team meeting, not the project manager's meeting
 - b. Conduct team building at specific times during the project through off-site meetings
 - c. Engage the services of a full-time facilitator before any team-building initiatives are conducted
 - d. Develop the project schedule using the services of a project control officer and then issue it immediately to the team

118. You have been assigned as the project manager for a major project in your company where the customer and key supplier are located in another country. You have been working on your project for six months. Recently, you traveled to this country, and at the conclusion of a critical design review meeting, which was highly successful, you realized you were successful in building a high-performing team. You had your own team members, who work in a weak matrix structure, on a conference call during this meeting. Although it was difficult to reach agreement on some key issues, you therefore relied on your interpersonal skills in—
- a. Facilitation
 - b. Negotiating
 - c. Influencing
 - d. Decision making
119. You are leading a team to review and improve the project selection and prioritization method. You know that the two most important questions to answer are “can we do the project?” (feasibility study) and “should we do the project?” (cost-benefit analysis). The team is considering many different management concerns, including financial return, market share, and public perception. The most important criterion for building a project selection model is—
- a. Risks
 - b. Realism
 - c. Ease of use
 - d. Benefits realization

120. Because risk management is relatively new on projects in your company, you decide to examine and document the effectiveness of risk responses in dealing with identified risks and their root causes. You therefore—
- a. Conduct a risk audit
 - b. Hold a risk status meeting
 - c. Ensure that risk is an agenda item at regularly scheduled staff meetings
 - d. Reassess identified risks on a periodic basis
121. Thinking back to lessons that your company learned from experiences with its legacy information systems during the Y2K dilemma, you finally convinced management to consider systems maintenance from the beginning of the project. However, maintenance should—
- a. Always be included as an activity to be performed during the closeout phase
 - b. Have a separate phase in the life cycle for information systems project because 60% to 70% of computer systems' life-cycle costs generally are devoted to maintenance
 - c. Not be viewed as part of the project life cycle
 - d. Be viewed as a separate project
122. On your systems development project, you noted during a review that the system had less functionality than planned at the critical design review. This note suggests that during the control risks process you used which following tools and techniques?
- a. Risk reassessment
 - b. Variance analysis
 - c. Technical performance measurement
 - d. Reserve analysis

123. The workaround that you used to deal with a risk that occurred should be documented and included in which following processes?
- a. Report performance and monitor and control risks
 - b. Validate scope and perform quality assurance
 - c. Direct and manage project work and perform integrated change control
 - d. Monitor and control project work and control risks
124. Contested changes are requested changes when the buyer and seller cannot agree on compensation for the change. They are also known as all but which one of the following?
- a. Disputes
 - b. Demands
 - c. Appeals
 - d. Claims
125. A structured review of the seller's progress to deliver project scope and quality within cost and schedule is known as a(n)—
- a. Procurement performance review
 - b. Procurement audit
 - c. Inspection
 - d. Status review meeting

126. Within your company's portfolio, your project is ranked in the top five in terms of importance of the 60 projects under way; however, the number of resources available to you is still limited. You have decided to pilot test the use of critical chain on your project. You have calculated your critical path. You want to ensure that your target finish date does not slip in the critical chain method. To do so you should—
- Add a project buffer
 - Put in three feeding buffers
 - Determine the drum resource
 - Manage the total float of the network paths
127. The greatest degree of uncertainty is encountered during which phase of the project life cycle?
- Concept
 - Planning
 - Implementation
 - Closeout
128. A team-building approach that facilitates concurrent engineering is—
- Matrix management
 - Fast-tracking
 - Tight matrix
 - Task force

129. A number of different decision-making styles can be used in a team environment. When quality and acceptance are both important, which of the following styles should be used?
- a. Command
 - b. Consultation
 - c. Consensus
 - d. Coin flip
130. Historical information is used—
- a. To compare current performance with prospective lessons learned
 - b. To prepare the stakeholder management plan
 - c. To evaluate the skills and competencies of prospective team members
 - d. As an input to develop project charter
131. Work completed, key performance indicators, technical performance measures, start and finish dates of schedule activities, number of change requests, number of defects, actual costs, and actual decisions are examples of work performance data are an output of—
- a. Project plan development
 - b. Risk control
 - c. Monitor and control project work
 - d. Direct and manage project work

132. Two team members on your current construction project are engaged in a major argument concerning the selection of project management software. They refuse to listen to each other. The most appropriate conflict resolution approach for you to use in this situation is—
- a. Accommodating
 - b. Compromising
 - c. Collaborating
 - d. Forcing
133. As you use the critical chain method in lieu of the critical path method in developing your schedule, assume you have determined the buffer schedule activities. Your planned activities are scheduled to their latest possible planned start and end dates. Therefore, you are focusing on—
- a. Managing the free float of each network path
 - b. Managing the total float of the network paths
 - c. Managing remaining buffer durations against the remaining durations of task chains
 - d. Managing the total buffer durations against the durations of the task chains
134. A key member of your project has deep technical skills and many years of experience in the company. Although she is not a manager, people respect her and do what she suggests. Of the following types of power, which one does she have?
- a. Legitimate
 - b. Reward
 - c. Referent
 - d. Expert

135. You have been placed in charge of a group of people that is selecting one of three possible projects. As you gather in the conference room, many team members already have decided which project selection technique to use. Some prefer IRR, and others argue for BCR. In deciding which method to use, your first step should be to—
- a. Compare and contrast selection techniques and identify the advantages and disadvantage of each
 - b. Identify the technique used most often in the company and determine if it is appropriate for this project
 - c. Select the method for which most team members have knowledge
 - d. Determine the philosophy and wishes of management
136. Before considering a project closed, what document should be reviewed to ensure that project scope has been satisfied?
- a. Project scope statement
 - b. Project management plan
 - c. Project closeout checklists
 - d. Scope management plan

137. A cost management plan should establish and document the various earned value rules of performance measurement. Along with defining the WBS to the level that the earned value analysis will be performed and establishing how earned value will be credited to the project (0-100, 0-50-100, and so on), which following rule is also recognized regarding performance measurement?
- a. Determine the formula for calculating the estimate to complete (ETC) for the project
 - b. Determine the code of accounts allocation provision for the WBS
 - c. Determine the formula for calculating the estimate at completion (EAC) for the project
 - d. Determine the variance thresholds to be used in the project
138. All the following elements are organizational process asset updates, resulting from closing a project or phase EXCEPT—
- a. Project files
 - b. Project or phase closure documents
 - c. Historical information
 - d. Final product, service, or result transition
139. You have a conflict on your team but have enough time to resolve it, and you want to maintain future relationships. Thankfully, there is mutual trust, respect, and confidence among the parties involved. You decide to use confronting to resolve this conflict. In using this approach, your first step should be to—
- a. Separate people from the problem
 - b. Acknowledge that conflict exists
 - c. Establish ground rules
 - d. Explore alternatives

140. One way to evaluate the project schedule performance is to—
- a. Use the project management information system (PMIS)
 - b. Determine the percent complete of in-progress schedule activities
 - c. Establish a schedule change control system
 - d. Determine the total float variance
141. Validate scope works hand-in-hand with control quality and generally follows control quality. A tool and technique used in validate scope that is not used in control quality is—
- a. Group decision-making techniques
 - b. Inspection
 - c. Statistical sampling
 - d. Variance analysis
142. Research has shown that during the execution phase of the project, the majority of conflicts involve—
- a. Personalities
 - b. Project priorities
 - c. Cost
 - d. Schedule
143. You are a goal-oriented project manager who is more interested in work accomplishment than relationship building. This indicates that you tend to resolve conflicts primarily through the use of—
- a. Smoothing
 - b. Compromising
 - c. Collaborating
 - d. Forcing

144. You are working on a long-term project that has a number of benefits to its customers and users. Therefore, as the project manager, one of your first steps was to identify the stakeholders that were critical to project success. Because this project will need long-term support by your organization once it is completed, key stakeholders are—
- a. Operations managers
 - b. Functional managers
 - c. Sellers
 - d. Business partners
145. Effective communication occurs in groups as well as between individuals and is made up of several key components, such as the purpose of the message, the audience that you are delivering the message to, and the content of the message itself. One important area to consider when working with manage communications—
- a. The choice of media
 - b. How often to distribute the information
 - c. The communications plan
 - d. The project performance report structure
146. A conflict resolution approach that is NOT considered to be very effective when more than a few players are involved and their viewpoints are mutually exclusive is—
- a. Forcing
 - b. Avoiding
 - c. Compromising
 - d. Collaborating

147. The key output of identify stakeholders that documents identification information, assessment information, and classification is the—
- a. Stakeholder management plan
 - b. Communications plan
 - c. Stakeholder register
 - d. Communications log
148. Improvement to the processes and the product is a goal of project quality management. Assume that after completing a quality audit, you have discovered some gaps/shortcomings in the way that the project team is completing one deliverable. As an output to perform quality assurance, you would create which following item that feeds directly into the perform integrated change control processes?
- a. Quality management plan updates
 - b. Risk register
 - c. Change requests
 - d. Project document updates
149. The estimate costs process uses all the following tools and techniques EXCEPT—
- a. Three-point estimating
 - b. Cost of quality assumptions
 - c. Reserve analysis (contingency reserves)
 - d. Basis of estimates

150. A contract typically is used when a project is being performed for an external customer. An agreement is used as an input to—
- a. Develop project charter
 - b. Develop project team
 - c. Plan procurement management
 - d. Conduct procurements
151. As you prepare to close your project, which of the following is an input to the close project or phase process?
- a. Work performance information
 - b. Expert judgment
 - c. Accepted deliverables
 - d. Change requests
152. Managing change to the scope baseline is the main objective of the process of control scope. The scope baseline consists of the following components EXCEPT—
- a. Project scope statement
 - b. WBS
 - c. WBS dictionary
 - d. Scope management plan

153. Assume you have been working with your sponsor to prepare your charter, and you plan to present it to your Steering Committee on Friday. You are managing a software project, and the business need stated that you should use agile for the first time in our company rather than waterfall. In the Develop Project Charter process, this is then—
- a. Tool and technique
 - b. Part of the enterprise environment factors as an input to this process
 - c. A high-level requirement
 - d. Stated in the strategic plan as a tool and technique in this process
154. Procurement documents are used in the identify stakeholder process because they—
- a. Are an enterprise environmental factor and an input to the process
 - b. Are an organizational process asset and an input to the process
 - c. Note key stakeholders as parties in the contract
 - d. Serve as a way to prioritize and classify stakeholders
155. You completed your stakeholder analysis. How do you want to manage those stakeholders that have a high interest in your project and high power over decisions affecting your project?
- a. Manage them closely
 - b. Keep them satisfied
 - c. Keep them informed
 - d. Monitor them occasionally

156. Change requests include a group of potential changes to a project. Types of change requests include all the following EXCEPT—
- a. Defect repairs
 - b. Maintenance requests
 - c. Corrective actions
 - d. Preventive actions
157. You are working on a project that needs approval from your City Council and the courts, because the project is one with significant environmental and social impacts. Although many consumer groups are advocates of this project, others are opposed to it. Hearings are scheduled to resolve these issues and to obtain the needed permits to proceed. In preparing your human resource plan, you decide to designate a person as the court liaison, which is an example of a—
- a. Role
 - b. Responsibility
 - c. Required competency
 - d. Ability of the team member to make appropriate decisions

158. Assume you are managing an international project. Your team is located in Atlanta, Georgia, US; Berlin, Germany; and Melbourne, Australia. You and your sponsor are located in Paris, France, and your customer is located in Athens, Greece. Recognizing the different locations of the stakeholders in your project in its initial stages, a best practice to follow in terms of working toward project success is to—
- Determine who decides the project is a success
 - Aligning the personal inputs of different project participants with a vision focused on success
 - Establishing the project culture during the initiating stage of the project
 - Identifying basic cultural characteristics and selecting one to follow
159. As a project manager, you recognize the importance of actively engaging key project stakeholders on a project. You have prepared an analysis of your stakeholders early in your project and classified them according to their interest, influence, and involvement in your project. You want to now—
- Focus on relationships necessary to ensure success
 - Assess stakeholder legitimacy
 - Determine the urgency that each stakeholder requires when he or she requests information about the project
 - Focus on each stakeholder's power relevant to the project

160. Based on a recent quality audit of your project, your organization's quality assurance department is supportive of your approach as it notes the following characteristics of quality that are being followed consistency. They include all of the follow EXCEPT—
- a. Cost of quality
 - b. Customer satisfaction
 - c. Management responsibility
 - d. High-performing team
161. The plan quality management process includes all the following techniques EXCEPT—
- a. Benchmarking
 - b. Design of experiments
 - c. Process analysis
 - d. Control charts
162. You are managing a major international project that involves multiple performing organizations. To establish the guiding rules for the project regarding quality, you and your project team must develop a—
- a. Improvement management plan
 - b. Configuration management plan
 - c. Quality policy
 - d. List of quality metrics for the project

163. You are working on a project that management has decided to terminate early, because the product was rendered obsolete by the introduction of new technology by a competitor. You have awarded a contract for part of the project that will be terminated, and fortunately have a clause that enables you to terminate it for convenience at any time. This means that—
- a. Your contractual obligations are complete once you issue the termination for convenience
 - b. You may need to compensate the seller for seller preparations and for any completed or accepted work
 - c. You need to compensate the seller only for accepted work that was completed prior to the termination order
 - d. Specific rights and responsibilities are determined once the termination order is issued
164. Of the following, which one is NOT true concerning a contract?
- a. It is a legal relationship subject to remedy in the courts.
 - b. It can take the form of a complex document or a simple purchase order.
 - c. It is a mutually binding legal relationship that obligates the seller to provide specific products, services, or results and obligates the buyer to pay the seller.
 - d. It includes a specific contract management plan.
165. All of the following can be used in lieu of the term “bidders conferences” EXCEPT—
- a. Contractor conferences
 - b. Pre-bid conferences
 - c. Vendor conferences
 - d. Project review meetings

166. Assume you are preparing your procurement management plan. A useful tool and technique is to—
- Have a meeting
 - Use your risk register
 - Review the requirements document
 - Use your stakeholder register
167. Your role in the project includes helping to resolve problems; making recommendations regarding priorities; accelerating activities to meet the target schedule; promoting communications among project team members; and helping management monitor the project's progress on a regular basis. Most of the people working on your project are scientists or technical experts. You are working in which of the following types of organizational structures?
- Task force
 - Balanced matrix
 - Project expeditor
 - Project coordinator
168. In order for a matrix organizational approach to be successful, the two-boss situation should be resolved. To overcome the two-boss problem, it is important to—
- Have the project manager and the functional manager work together to complete performance evaluations
 - Prepare a responsibility chart to define responsibilities
 - Guarantee a balance of power between the functional manager and the project manager
 - Promote interface relationship management

169. The resource calendar is an output of which following process?
- a. Develop project team
 - b. Acquire project team
 - c. Estimate activity durations
 - d. Manage project team
170. An intentional activity to ensure future performance of project work is aligned with the project management plan is—
- a. Preventive action
 - b. Corrective action
 - c. Implemented change requests
 - d. Work performance information
171. Close procurements is a process that involves includes activities for administrative closure such as—
- a. Customer acceptance and final payment
 - b. Audit project success or failure and archiving records
 - c. Final contractor payment and lessons learned
 - d. Transition of the final product and acceptance of deliverables

172. As a project manager, not only must you be a leader, but you also must be responsible for the management, administrative, and technical aspects of the project. Which following skill is NOT representative of the skills needed for project leadership/interpersonal relations?
- a. Influencing the organization by sharing power and getting others to cooperate toward common goals
 - b. Creating an environment to meet project objectives while offering maximum self-satisfaction related to what people value the most
 - c. Helping a group of people bound by a common sense of purpose to work interdependently with each other
 - d. Understanding of policies, operating procedures, and regulations of external stakeholder organizations
173. Assume you are managing a project, and your project management plan has been approved. Your project has a high level of change associated with it. There is active and ongoing stakeholder involvement. This means you probably are working with a(n)—
- a. Adaptive life cycle
 - b. Iterative life cycle
 - c. Incremental life cycle
 - d. Predictive life cycle
174. One way to help mitigate personnel risks that may occur during the end of the project is to—
- a. Meet individually with each team member
 - b. Provide specific recognition to each team member who has worked on the project
 - c. Prepare a staff release plan
 - d. Document the time each person is to work on the project in a resource calendar

175. You are conducting a stakeholder analysis on your project. After identifying potential stakeholders, the next step in the process is to—
- Determine their desired level of participation
 - Provide detailed contact information for each identified stakeholder
 - Perform an assessment to see how each stakeholder might react in certain situations
 - Analyze each stakeholder's impact or support and classify them
176. Assume your project communication management plan has been approved by your sponsor and the members of your Steering Committee. You are managing a global project and have team members working virtually in four continents and stakeholders in numerous locations. Your next step is to—
- Set up an information management system
 - Select communications technology
 - Determine performance reporting methods
 - Select a communications model
177. Although your project team is working virtually, you are striving to make it a high-performing team. You held a virtual kickoff meeting to ensure there was a shared project vision. You now see that team members are addressing the work to be done, but they do not seem to be collaborating. You realize the team is—
- Concerned about their formal roles and responsibilities
 - Independent
 - Forming
 - Storming

178. You are conducting a stakeholder analysis on your project. Your organization uses an approach to classify stakeholders based on their level of authority and their active involvement in the project. This approach is known as—
- a. A power/interest grid
 - b. A power/influence grid
 - c. An influence/impact grid
 - d. A salience model
179. When managing projects, one important technique is capturing lessons learned from previous projects to improve the organization's project management process. Therefore, in planning the project, it is important to plan the closing procedures, particularly to review the—
- a. Risk responses that were used
 - b. Checklists for risk identification
 - c. WBS and scope documents
 - d. Team members' performance feedback
180. The basic approach to quality management in projects is to be compatible with which of the following:
- a. Six-Sigma, failure mode and effect analysis, and total quality management
 - b. The International Organization for Standardization (ISO)
 - c. Methods, such as those recommended by Deming, Juran, and Crosby
 - d. Inspection over prevention

181. During a bidders conference, it is important that—
- a. Only qualified sellers participate
 - b. All potential sellers are given equal standing
 - c. The evaluation criteria for the proposal is used to determine participation
 - d. Responses to questions be provided solely to the prospective seller that asked the question
182. One key interpersonal skill used to manage stakeholder expectations is—
- a. Negotiation skills
 - b. Building trust
 - c. Compromise
 - d. Conversation
183. You are a project manager leading the construction project of a new garbage incinerator. Local residents and environmental groups are opposed to this project because of its environmental impact. Management agrees with your request to partner with a third party that will be responsible for providing state-of-the-art “air scrubbers,” to clean the exhaust to an acceptable level. This decision will delay the project but will allow it to continue. It is an example of which following risk response?
- a. Passive acceptance
 - b. Active acceptance
 - c. Mitigation
 - d. Transference

184. All the following are processes in project procurement management EXCEPT—
- a. Terminate procurements
 - b. Control procurements
 - c. Plan procurement management
 - d. Close procurements
185. Working in the systems integration field, you are primarily responsible for coordinating the work of numerous sub-contractors. Your current project is coming to an end. You have 15 major subcontractors as well as a variety of other sellers. Now that you are closing contracts (procurements), you should—
- a. Conduct a trend analysis
 - b. Use earned value to assess lessons learned
 - c. Ask each contractor to meet with you individually at its own expense
 - d. Conduct a procurement audit
186. You are managing a moderately risky project. You have done well identifying risks and assessing them both on the probability of the risk event occurring and on the level of impact that the risk could have on your project if it actually occurred. But to help with a “next” level of qualitative risk analysis, you could use a—
- a. Risk priority assessment
 - b. Risk quality assessment
 - c. Risk urgency assessment
 - d. Quantitative risk analysis

187. You are identifying possible risks to your project concerning the development of a nutritional supplement. You want to reach out to your experts and build consensus on the risks that qualitative and quantitative risk analysis can address later. Although you can use various techniques, a key information gathering technique that helps to build consensus is—
- a. Documentation review
 - b. Probability/impact analysis
 - c. Checklist analysis
 - d. Delphi technique
188. Managing five contractors on your project for a new stadium in your City that can be used for baseball and for football and can be easily converted for either sport is a challenge along with managing your 15 person project team. You decided to conduct an audit of one of your contractors and are—
- a. Using it as a baseline for improvements to the other contracts under way
 - b. Verifying compliance in the seller's work processes
 - c. Accompanying it with a project quality audit
 - d. Using it for lessons learned documentation
189. A weighting system can be used for all but which one of the following reasons?
- a. To select a single seller that will be asked to sign a standard contract
 - b. To establish a negotiating sequence by ranking all proposals by the weighted evaluation scores that have been assigned
 - c. To quantify qualitative data to minimize possible bias
 - d. To establish minimum requirements of performance for one or more of the evaluation criteria

190. One way to make it more likely practice project risk management on projects is to—
- Hold meetings
 - Have the team take an orientation class on risk management early in the project
 - Give one team member the responsibility for risk management working in conjunction with the PMO
 - Assign each team member a risk to own, which is documented in the risk register
191. Your firm specializes in roller-coaster construction. It recently received an RFP to build the world's most "death-defying" roller coaster. You know that such a roller coaster has never been built before and that this would be a high-risk project. You are receiving a cost-plus-award-fee contract, which means—
- Your fee will be paid for completed work
 - Your fee amount will not change unless there is a scope change
 - Your fee is generally not subject to appeals
 - If your final cost is greater, you will share costs with the buyer based on a pre-negotiated cost sharing formula
192. Work performance information in control risks means that—
- Recommended preventive or corrective action is considered through change requests
 - Outcomes of risk reassessments and risk audits are documented
 - Templates to the risk management plan and the risk register are recommended
 - A mechanism to communicate and support project decision making is provided

193. A number of factors affect make-or-buy decisions such as—
- a. Desired level of quality
 - b. Risk-related contract decisions
 - c. Value delivered by vendors meeting the needs
 - d. Performance data
194. For complex procurement items, often contract negotiation can be an independent process. An example of an input if such a process is used is—
- a. Open items list
 - b. Approved changes
 - c. Documented decisions
 - d. Expert judgment
195. Marketplace conditions are an input to which one of the following processes?
- a. Plan procurement management
 - b. Conduct procurements
 - c. Control procurements
 - d. Close procurements
196. Each project can benefit from stakeholder involvement; however, it is in both the project manager's and the teams' best interest to ensure that all project stakeholders have positive attitudes toward the project and its goals and objectives. Working as a project manager, you have a number of key stakeholders on your project. The stakeholder that identifies potential conflicts between organizational strategies and project goals is the—
- a. Chairperson of the Governance Board
 - b. Program manager
 - c. Director of the project management office
 - d. Chief Operating Officer

197. While many different techniques can be used to rate or score proposals, all will use—
- a. A screening system
 - b. A weighting system in conjunction with a screening system
 - c. Expert judgment and some form of proposal evaluation techniques
 - d. Quality ratings and contractual compliance
198. When determining the message that you will deliver to stakeholders, knowing both the content (what you want to say) and your audience is important. Which of the following helps you to understand how others may interpret your message?
- a. Sender-receiver models
 - b. Facilitation techniques used in delivery
 - c. Negotiation skills
 - d. Presentation skills used in the development of the message
199. One of the reasons why it is challenging to work on a virtual team is that e-mail is the primary form of communications. However, words alone typically comprise what percent of the total impact of any message?
- a. Seven percent
 - b. 15 percent
 - c. 38 percent
 - d. 55 percent

200. Assume you are working on a multi-phase project as your project is planned to last three years. A best practice is to—
- a. Periodically review the business case
 - b. Use a single prime contractor and have this contractor award any subcontracts
 - c. Rely on your PMO for guidance
 - d. Set up a 'tight matrix'

Answer Sheet

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d

21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
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63.	a	b	c	d
64.	a	b	c	d
65.	a	b	c	d
66.	a	b	c	d
67.	a	b	c	d
68.	a	b	c	d
69.	a	b	c	d
70.	a	b	c	d
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90.	a	b	c	d
91.	a	b	c	d
92.	a	b	c	d
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111.	a	b	c	d
112.	a	b	c	d
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114.	a	b	c	d
115.	a	b	c	d
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127.	a	b	c	d
128.	a	b	c	d
129.	a	b	c	d
130.	a	b	c	d
131.	a	b	c	d
132.	a	b	c	d
133.	a	b	c	d
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135.	a	b	c	d
136.	a	b	c	d
137.	a	b	c	d
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140.	a	b	c	d

141.	a	b	c	d
142.	a	b	c	d
143.	a	b	c	d
144.	a	b	c	d
145.	a	b	c	d
146.	a	b	c	d
147.	a	b	c	d
148.	a	b	c	d
149.	a	b	c	d
150.	a	b	c	d
151.	a	b	c	d
152.	a	b	c	d
153.	a	b	c	d
154.	a	b	c	d
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175.	a	b	c	d
176.	a	b	c	d
177.	a	b	c	d
178.	a	b	c	d
179.	a	b	c	d
180.	a	b	c	d

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182.	a	b	c	d
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185.	a	b	c	d
186.	a	b	c	d
187.	a	b	c	d
188.	a	b	c	d
189.	a	b	c	d
190.	a	b	c	d
191.	a	b	c	d
192.	a	b	c	d
193.	a	b	c	d
194.	a	b	c	d
195.	a	b	c	d
196.	a	b	c	d
197.	a	b	c	d
198.	a	b	c	d
199.	a	b	c	d
200.	a	b	c	d

Appendix: Study Matrix

Overview

Periodically, the Project Management Institute (PMI®) publishes a Role Delineation Study (RDS) and uses to define the responsibilities of the recipients of the Project Management Professional (PMP®) credential. In 2009, PMI® commissioned a new RDS for the PMP®, which then was published as the PMI® PMP® *Examination Content Outline* (ECO) and issued it in July 2011. It serves as the foundation for the PMP® exam and for our 200-question practice test in this book and in our on line test.

The ECO identified five broad performance domains and determined how the 175 questions on the PMP® exam would be distributed according to these domains*. The distribution is as follows:

I	Initiating	13%
II	Planning	24%
III	Executing	30%
IV	Monitoring and Controlling	25%
V	Closing	8%

* PMI® distributes 25 pretest questions across the six domains in any way that it deems appropriate for the purpose of “testing” the questions.

The matrix beginning on page identifies each practice test question according to its performance domain and its knowledge area in the *PMBOK® Guide*.

The matrix is designed to help you—

- Assess your strengths and weaknesses in each of the performance domains
- Identify those areas in which you need additional study before you take the PMP® exam

Here is an easy way to use the matrix:

Step 1 Circle all the questions you missed on the practice test in Column 1.

Step 2 For each circled question, note the corresponding process in Column 2.

Step 3 To determine whether any patterns emerge indicating weak areas, tally the information you obtained from the matrix.

Step 4 To ensure that you have a good understanding of the major management processes that define a particular knowledge area, including the input, tools and techniques, and output, refer to the appropriate knowledge area in the *PMBOK® Guide*.

The last column in the matrix is provided for your notes.

Study Matrix

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
1	Planning	Integration	
2	Executing	Integration	
3	Executing	Procurement	
4	Planning	Scope	
5	Planning	Integration	
6	Monitoring and Controlling	Procurement	
7	Executing	Integration	
8	Planning	Integration	
9	Planning	Scope	
10	Executing	Quality	
11	Executing	Quality	
12	Monitoring and Controlling	Procurement	
13	Monitoring and Controlling	Integration	
14	Planning	Procurement	
15	Monitoring and Controlling	Integration	
16	Initiating	Integration	
17	Executing	Quality	
18	Monitoring and Controlling	Integration	
19	Monitoring and Controlling	Integration	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
20	Monitoring and Controlling	Integration	
21	Planning	Scope	
22	Closing	Integration	
23	Monitoring and Controlling	Integration	
24	Executing	Quality	
25	Monitoring and Controlling	Scope	
26	Closing	Integration	
27	Executing	Quality	
28	Planning	Risk	
29	Planning	Scope	
30	Executing	Quality	
31	Monitoring and Controlling	Integration	
32	Initiating	Integration	
33	Executing	Human Resources	
34	Monitoring and Controlling	Time	
35	Monitoring and Controlling	Cost	
36	Monitoring and Controlling	Time	
37	Planning	Scope	
38	Closing	Integration	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
39	Planning	Scope	
40	Monitoring and Controlling	Cost	
41	Executing	Human Resources	
42	Monitoring and Controlling	Cost	
43	Monitoring and Controlling	Cost	
44	Initiating	Integration	
45	Planning	Integration	
46	Executing	Integration	
47	Monitoring and Controlling	Cost	
48	Planning	Scope	
49	Executing	Communications	
50	Monitoring and Controlling	Cost	
51	Executing	Human Resources	
52	Planning	Scope	
53	Monitoring and Controlling	Time	
54	Planning	Risk	
55	Executing	Human Resources	
56	Monitoring and Controlling	Cost	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
57	Monitoring and Controlling	Cost	
58	Initiating	Integration	
59	Closing	Integration	
60	Planning	Risk	
61	Executing	Human Resources	
62	Planning	Time	
63	Monitoring and Controlling	Cost	
64	Planning	Time	
65	Executing	Human Resources	
66	Planning	Time	
67	Monitoring and Controlling	Human Resources	
68	Monitoring and Controlling	Integration	
69	Planning	Time	
70	Planning	Time	
71	Planning	Time	
72	Planning	Time	
73	Monitoring and Controlling	Time	
74	Executing	Integration	
75	Executing	Human Resources	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
76	Closing	Procurement	
77	Monitoring and Controlling	Procurement	
78	Initiating	Integration	
79	Monitoring and Controlling	Quality	
80	Executing	Human Resources	
81	Monitoring and Controlling	Quality	
82	Executing	Human Resources	
83	Monitoring and Controlling	Quality	
84	Monitoring and Controlling	Quality	
85	Executing	Human Resources	
86	Monitoring and Controlling	Time	
87	Executing	Integration	
88	Initiating	Integration	
89	Executing	Communications	
90	Monitoring and Controlling	Quality	
91	Monitoring and Controlling	Quality	
92	Planning	Cost	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
93	Planning	Cost	
94	Executing	Human Resources	
95	Closing	Procurement	
96	Monitoring and Controlling	Quality	
97	Planning	Time	
98	Executing	Human Resources	
99	Monitoring and Controlling	Human Resources	
100	Monitoring and Controlling	Time	
101	Planning	Time	
102	Planning	Time	
103	Monitoring and Controlling	Time	
104	Executing	Human Resources	
105	Initiating	Integration	
106	Monitoring and Controlling	Risk	
107	Initiating	Integration	
108	Closing	Integration	
109	Planning	Time	
110	Executing	Human Resources	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
111	Closing	Procurement	
112	Closing	Integration	
113	Closing	Integration	
114	Initiating	Integration	
115	Executing	Human Resources	
116	Executing	Human Resources	
117	Executing	Human Resources	
118	Monitoring and Controlling	Integration	
119	Initiating	Integration	
120	Monitoring and Controlling	Risk	
121	Initiating	Integration	
122	Monitoring and Controlling	Risk	
123	Monitoring and Controlling	Risk	
124	Monitoring and Controlling	Procurement	
125	Monitoring and Controlling	Procurement	
126	Planning	Time	
127	Initiating	Integration	
128	Executing	Human Resources	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
129	Executing	Human Resources	
130	Initiating	Integration	
131	Executing	Integration	
132	Executing	Human Resources	
133	Planning	Time	
134	Executing	Human Resources	
135	Initiating	Integration	
136	Closing	Integration	
137	Planning	Cost	
138	Closing	Integration	
139	Executing	Human Resources	
140	Monitoring and Controlling	Time	
141	Monitoring and Controlling	Scope	
142	Executing	Human Resources	
143	Executing	Communications	
144	Initiating	Stakeholders	
145	Executing	Communications	
146	Executing	Communications	
147	Initiating	Stakeholders	
148	Executing	Quality	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
149	Planning	Cost	
150	Initiating	Integration	
151	Closing	Integration	
152	Monitoring and Controlling	Scope	
153	Initiating	Integration	
154	Initiating	Stakeholders	
155	Initiating	Stakeholders	
156	Executing	Integration	
157	Planning	Time	
158	Initiating	Integration	
159	Initiating	Stakeholders	
160	Planning	Quality	
161	Planning	Quality	
162	Planning	Quality	
163	Executing	Procurement	
164	Executing	Procurement	
165	Executing	Procurement	
166	Planning	Procurement	
167	Planning	Human Resources	
168	Planning	Human Resources	
169	Planning	Human Resources	
170	Executing	Integration	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
171	Closing	Procurement	
172	Executing	Communications	
173	Executing	Integration	
174	Planning	Time	
175	Initiating	Stakeholders	
176	Executing	Communications	
177	Executing	Human Resources	
178	Initiating	Stakeholders	
179	Planning	Risk	
180	Executing	Quality	
181	Executing	Procurement	
182	Executing	Stakeholders	
183	Planning	Risk	
184	Closing	Procurement	
185	Closing	Procurement	
186	Planning	Risk	
187	Planning	Risk	
188	Monitoring and Controlling	Procurement	
189	Executing	Procurement	
190	Monitoring and Controlling	Risk	
191	Planning	Procurement	
192	Monitoring and Controlling	Risk	

<i>Practice Test Question Number</i>	<i>Performance Domain Process</i>	<i>Knowledge Area</i>	<i>Study Notes</i>
193	Executing	Procurement	
194	Executing	Procurement	
195	Planning	Procurement	
196	Initiating	Stakeholders	
197	Executing	Procurement	
198	Executing	Communications	
199	Executing	Communications	
200	Initiating	Integration	

Answer Key

1. c. It is not a problem at this time. The previous project manager was using the rolling wave planning technique, so you are able to continue defining the activities.

Rolling wave planning provides progressive detailing of the work to be accomplished throughout the life of the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 131, 152

2. d. Confusion of establishing a project in the matrix management environment

During project formation, there is always an element of confusion or lack of clarity regarding the balance of power between the project manager and functional managers. If not resolved, such confusion manifests itself in conflicts regarding technical decisions, resource allocation, and scheduling later in the project. [Executing]

Meredith and Mantel 2012, 151–152

3. c. Analytical techniques

Analytical techniques are a tool and technique n conduct procurements. They are used to help organizations identify the readiness of a vendor to provide the desired end state, determine costs to support budgeting, and avoid cost overruns In evaluating past performance they identify areas that have more risk and that may need to be monitored closely for project success. [Executing]

PMI®, *PMBOK® Guide*, 2013, 376

4. a. Action requirements

Such classification systems are helpful in both defining and documenting stakeholder needs to meet project objectives. Project requirements are ones that involve actions, processes, or other conditions the project needs to meet. [Planning]

PMI®, *PMBOK® Guide*, 2013, 112

5. b. Organizational process assets

Organizational process assets include formal and informal plans, policies, procedures, and guidelines. As an input to the develop project management plan process, they include the items listed as well as standardized guidelines, instructions, proposal evaluation criteria, and performance measurement criteria; project management plan template; change control procedures; project files from previous projects; and historical information and lessons learned [Planning]

PMI®, *PMBOK® Guide*, 2013, 75

6. a. Control procurements

The purpose of control procurements is to ensure that the contractual requirements are met by the seller. This objective is accomplished by managing procurement relationships, monitoring contract performance and making changes and corrections to contracts if appropriate. [Monitoring and Controlling]
PMI®, *PMBOK® Guide*, 2013, 379

7. a. Expert

Expert power is a function of knowledge, skills, and reputation possessed by the project manager. In such situations, project personnel will do what the project manager wants because they believe he or she knows best, and they trust and respect the project manager. [Executing]

Adams et al. 1997, 174–180

Verma 2005, 54

Levin 2010, 163

8. b. Requirements baseline

The scope, schedule, and cost baselines may be combined into a performance measurement baseline. It also may include technical and quality parameters. It then is used as an overall project baseline against which project execution is compared to measure and manage performance. It also is used for earned value measurements. [Planning]

PMI®, *PMBOK® Guide*, 2013, 302, 549

9. c. Job shadowing

Observations are a tool and technique in the collect requirements process. They provide a way to view individuals in their environment and to see how they perform their jobs or tasks and carry out processes. Another term for this approach is job shadowing and usually is done by an observer viewing the user performing his or her job. [Planning]

PMI®, *PMBOK® Guide*, 2013, 116

10. b. Continuous process improvement

Continuous process improvement provides an iterative means for improving the quality of all processes and is part of the definition of quality assurance. Its objective is to reduce waste and eliminate non-value-added activities. [Executing]

PMI®, *PMBOK® Guide*, 2013, 242–243

11. c. Use an affinity diagram

In quality assurance an affinity diagram is used to generate ideas that can be linked to form organized patterns of thought about a problem. Using them in project management, one can enhance the creation of the WBS by using it to give structure to the decomposition of scope. [Executing]

PMI®, *PMBOK® Guide*, 2013, 245

12. c. \$118,000

In this situation, there is a \$10,000 overrun from the target costs. Applying the 80/20 share ratio, the seller's share of the overrun is 20% of \$10,000 or a minus \$2,000 in earned fee. The final value of this procurement is \$110,000 in costs, plus a seller fee of \$10,000 less \$2,000, or \$8,000 for a final price of \$118,000. [Monitoring and Controlling]

Fleming 2003, 92

13. c. Document the specific responsibilities of each stakeholder in the perform integrated change control process

Configuration management is an integral part of the perform integrated change control process. It is necessary because projects by their nature involve changes. The integrity of baselines must be maintained by releasing only approved changes for incorporation into the project's products or services and by maintaining their related configuration and planning documentation. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 96–97

14. b. Procurement management plan

The procurement management plan describes how the project management team will acquire goods and services from outside the performing organization. It describes how the procurement processes will be used from developing procurement documents through closing contracts. [Planning]

PMI®, *PMBOK® Guide*, 2013, 366–367

15. a. Scope, quality, schedule, budget, and risk

The constraints include, but are not limited to scope, schedule, budget (cost), quality, resources, and risk. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 6

16. b. Strategic plans

The configuration management knowledge base is an organizational process asset. It contains the versions and baselines of all company policies, practices, procedures, and standards, as well as pertinent project documents. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 98

17. d. A quality audit

A quality audit is a tool and technique for the perform quality assurance process. It is primarily used to determine whether the project team is complying with organizational and project policies, processes, and procedures. [Executing]

PMI®, *PMBOK® Guide*, 2013, 247

18. c. Informal

Change requests are an input to the perform integrated change control process. Although occurring in many forms, they must be formal requests developed within the context of a change control system consisting of documented procedures. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 96, 531

19. d. Allowing automatic approval of changes

Allowing for automatic approval of defined changes is a function of the change control system, not configuration management. Configuration management ensures that the description of the project product is correct and complete. The change control system consists of a set of procedures to describe how modifications to project deliverables and documentation are managed and controlled. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 94, 96, and 531

20. d. Change control meetings

Often, a project will set up a change control board, which has the responsibility for meeting and reviewing the change requests, and approving, rejecting, or other disposition of the changes. Decisions of the board are documented and communicated to stakeholders for information and follow-up actions. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 99

21. b. Adds business value as it links to business and project objectives

The requirements traceability matrix is a table that links requirements to their origin and traces them throughout the life cycle. This approach helps to ensure that each requirement adds value as it links to the business and project objectives. It also tracks requirements during the life cycle to help ensure that the requirements listed in the requirements document are delivered at the end of the project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 118

22. a. Schedule

In many projects, there is a rush to finish because of schedule slippages that develop in the execution/implementation phase. Delays in schedules become cumulative and impact the project most severely in the final stages of the project. While there are other sources of conflict, such as personalities and cost, attempting to finish on time is always on everyone's mind. [Closing]

Verma 1996, 103 and 105

23. b. Configuration management system

The formal configuration management system is an important tool and technique for scope control and focuses on deliverables and documents. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 96–97

24. a. Root cause analysis

Determining the root cause of the problem means to determine the origin of the problem. What may appear to be the problem on the surface is often revealed, after further analysis, not to be the real cause of the problem. Process analysis includes root cause analysis used to identify as problem, discover the underlying causes that lead to it and develop preventive actions. [Executing]

PMI®, *PMBOK® Guide*, 2013, 247

25. d. Validate scope typically precedes control quality

Validate scope focuses on accepting project deliverables, and to be accepted, they must meet the requirements. Control quality is one way to ensure that the requirements have been met, which is why control quality typically is done before validate scope. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 134

26. a. The company requires a continuous stream of projects to survive

Organizations that rely on products for their revenue must constantly be introducing new products into the marketplace as old products are removed. Ideally, this should be an overlapping process to maintain balanced or increasing revenue over time. The closure phase evaluates the efforts of the total system and serves as input to the conceptual phase for new projects and systems. It also has an impact on other ongoing projects with regard to identifying priorities. [Closing]

Kerzner 2009, 69–70

27. d. Cost of quality

Cost of quality involves both the cost of conformance and the cost of non-conformance. Examples of the cost of conformance are divided into two categories prevention costs and appraisal costs (includes inspections). Costs of non-conformance include internal failure costs and external failure costs. [Executing]

PMI®, *PMBOK® Guide*, 2013, 235

28. a. Identifies project assumptions

Project assumptions, which should be enumerated in the project scope baseline in the scope statement, are areas of uncertainty, and therefore, potential causes of project risk. [Planning]

PMI®, *PMBOK® Guide*, 2013, 322

29. c. Prototypes

Prototypes are used to obtain early feedback on requirements by providing a working model of the expected product before it is built. Stakeholders then can experiment with this model rather than discussing abstract representations of requirements. This approach supports progressive elaboration, because it is used in iterative cycles of mock-up creation, user experimentation, feedback generation, and prototype revision. [Planning]

PMI®, *PMBOK® Guide*, 2013, 116

30. a. Tools from control quality and plan quality management

The tools used from plan quality management and control quality are used in perform quality assurance. The perform quality assurance process also uses affinity diagrams, process decision program charts, interrelationship digraphs, tree diagrams, prioritization matrices, activity network diagrams, matrix diagrams, quality audits, and process analysis. [Executing]

PMI®, *PMBOK® Guide*, 2013, 245–247

31. d. Continuously monitor the project

The monitor and control project work process is performed throughout the project and includes collecting, measuring, and disseminating performance information and assessing measurements and trends to effect process improvement. Continuous monitoring is important because it provides insight into the project's health, highlighting areas requiring special attention. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 88

32. d. Determine whether the project should continue to the next phase

The review at the end of a project phase is called a phase-end review. The purpose of this review is to determine whether the project should continue to the next phase for detecting and correcting errors while they are still manageable and for ensuring that the project remains focused on the business need it was undertaken to address. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 41, 549

33. c. Celebrating

During the adjourning stage of team development, the emphasis is on tasks and relationships that promote closure and celebration. There is recognition and satisfaction as the theme is moving on and separation. Management skills involve evaluating, reviewing, and improving, while leadership qualities are celebrating and bringing closure. [Executing]

Verma 1997, 40; PMI®, *PMBOK® Guide*, 2013, 276

34. b. At +\$300, the situation is favorable, as physical progress is being accomplished ahead of your plan.

Schedule variance is calculated as $EV - PV$, or $\$1,500 - \$1,200 = +\$300$. Because the SV is positive, physical progress is being accomplished at a faster rate than planned. [Monitoring and Controlling]

Kerzner 2009, 648–649; PMI®, *PMBOK® Guide*, 2013, 224

35. d. Managing the approved cost baseline and any changes to it

The control costs process involves monitoring the project's status to update the project costs and managing changes to the cost baseline. Its benefit is that it provides the means to recognize variance in order to take corrective action and minimize risks. Therefore, effective management of the approved cost baseline and any changes is imperative. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 215–216

36. d. Recognize that your original estimates were fundamentally flawed, and your project is in an atypical situation

$CPI = EV/AC$. It measures the efficiency of the physical progress accomplished compared to the baseline. A CPI of 0.44 means that for every dollar spent, you are only receiving 44 cents of progress. Therefore, something is not correct with how you planned your project, or your original estimates were fundamentally flawed, and your project is in an atypical situation. You might want to reconsider a formal “replan” and/or take a new baseline of your project. [Monitoring and Controlling]

Kerzner 2009, 650–652; PMI®, *PMBOK® Guide*, 2013, 224

37. c. Project scope statement

The project scope statement describes in detail the deliverables and what work must be done to prepare them. Ancillary results are also considered deliverables and are included in the project scope statement. They include items such as project management reports and documentation. Deliverables in the project scope statement may be described at a summary level or in a detailed way. [Planning]

PMI®, *PMBOK® Guide*, 2013, 123

38. c. Expert judgment

According to the *PMBOK® Guide*, expert judgment is used in close project or phase to ensure closure is performed to appropriate standards. [Closing]

PMI®, *PMBOK® Guide*, 2013, 102

39. a. Project charter

Outputs of the define scope project are the project scope statement and project document updates that include updates to the stakeholder register, requirements documentation, and the requirements traceability matrix. [Planning]

PMI®, *PMBOK® Guide*, 2013, 125

40. c. $(\text{Percent complete}) \times (\text{budget at completion})$

Multiplying the percent complete by the budget at completion, or the total budget for the project, is the simplest formula to use. The 50/50 rule, or the more conservative 0/100 rule, can eliminate the necessity for the continuous determination of percent complete. After the percent complete is determined, it can be plotted against time expended. [Monitoring and Controlling]

Kerzner 2009, 656–657

41. a. Commence as scheduled and stated in the staffing management plan

Training is a tool and technique for the develop project team process. The requirements and schedule for the develop project team process should be stated in the staffing management plan. Project team members' skills can be developed as part of the project activities. [Executing]

PMI®, *PMBOK® Guide*, 2013, 266, 275

42. b. Milestone method

The milestone method is especially helpful for work packages of long duration that have interim milestones or a functional group of activities with a milestone established at specific control points. In the EV system, value is earned when the milestone is completed. In such cases, a budget is assigned to the milestone rather than to the work packages. [Monitoring and Controlling]

Kerzner 2009, 656

43. c. Estimate at completion

EAC is the total amount of money estimated to be spent on the project. It can be calculated several different ways. However, the basic approach is to add the actual costs to date plus the estimate to complete. [Monitoring and Controlling]

Kerzner 2009, 660

PMI®, *PMBOK® Guide*, 2013, 224

44. d. Links the project to the ongoing work of the organization

The project charter not only authorizes a project, it shows how the project is linked to the strategic plan of the organization. Among other things, the project charter documents the business need for the project and describes the current understanding of the requirements. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 68

45. a. Conflict resolution

Facilitation techniques are a tool and technique in develop project management plan process. Other examples are brainstorming, problem solving, and meeting management. They are used to help teams and individuals achieve agreement to accomplish the project's objectives. [Planning]

PMI®, *PMBOK® Guide*, 2013, 77

46. d. Process measurement data base

The process measurement data base is an organizational process asset that is used to collect and make available measurement data on processes and products. The other answers are examples of enterprise environmental factors used as inputs to direct and manage the project work. [Executing]

PMI®, *PMBOK® Guide*, 2013, 83

47. c. $EAC = [Actual\ to\ date] + [all\ remaining\ work\ to\ be\ done\ at\ the\ planned\ cost\ including\ remaining\ work\ in\ progress]$

This formula assumes that all of the remaining work is independent of the burn rate incurred thus far. AC is \$2,900 + [\$500 + \$1,000]. The \$500 is from Activity B, and the \$1,000 is from Activity C. [Monitoring and Controlling]

Kerzner 2009, 660

PMI®, *PMBOK® Guide*, 2013, 224

48. a. Certain deliverables or subprojects will be accomplished far into the future

Many projects involve deliverables or subprojects that will be accomplished far into the future and cannot be specified in detail at the current time. In these situations, the project management team typically waits until the deliverable or subproject is clarified so that details for that portion of the WBS can be developed. Then a rolling wave planning approach can be used. [Planning]

PMI®, *PMBOK® Guide*, 2013, 131

49. c. Manage communications process

Lessons learned documentation is an output of the manage communications process. It is an element of the organizational process assets updates. It includes the causes of issues, reasons for corrective actions selected, and other types of lessons learned about communications management. [Executing]

PMI®, *PMBOK® Guide*, 2013, 303

50. a. Influencing the factors that create change to the authorized cost baseline

The control costs process is also concerned with ensuring that requested changes have been acted upon, managing actual changes if and when they occur, ensuring cost expenditures do not exceed authorized funding, monitoring cost performance, preventing unapproved changes from being included in the reported cost or resource use, informing stakeholders of all approved changes and their costs and bringing expected cost overruns within acceptable limits. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 216

51. a. Respect and trust

Leadership is critical to project management as it focuses on ensuring a group of people are working toward a common goal and enables them to work as a team. It involves getting things done through others. Respect and trust, not fear and submission, are its key elements. [Executing]

PMI®, *PMBOK® Guide*, 2013, 513

52. b. 100% rule

The WBS is a deliverable-oriented, hierarchical decomposition of work to be done by the project team. Sometimes called the 100% rule, it shows the total of the work at the lowest levels must roll up to the higher levels so that nothing is left out and no extra work is done. [Planning]

PMI®, *PMBOK® Guide*, 2013, 131

53. b. Use fast tracking

Fast tracking or crashing the schedule for the remaining work to be done are examples of schedule compression techniques to find ways to bring project activities that are behind into alignment with the project management plan. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 190

54. c. \$6.42 million

Test: $\$5\text{M} + \$960\text{K} + \$460\text{K} = \6.42M ; Don't Test: $\$7\text{M}$. [Planning]

PMI®, *PMBOK® Guide*, 2013, 339

55. b. Herzberg's Motivator-Hygiene Theory

Frederick Herzberg's Motivator-Hygiene Theory asserts that some job factors lead to satisfaction, whereas others can only prevent dissatisfaction. There are two types of factors associated to the motivation process: hygiene factors, which relate to the work environment, and motivators, which relate to the work itself. Hygiene factors, if provided appropriately, can prevent dissatisfaction, while motivating factors can increase job satisfaction and are more permanent. [Executing]

Verma 1996, 56, 64–65

Meredith and Mantel, 2012, 200

56. a. Work performance information

The project's work performance information should document and communicate the CV, SV, CPI, SPI, TCPI, and VAC for the WBS components in particular for specific work packages and control accounts. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 225

57. d. A calculated EAC value or a bottom-up EAC value is documented and communicated to stakeholders

Cost forecasts are another output of control costs, and the EAC is used to show the expected total costs of completing all work expressed as the sum of the actual cost to date and the estimate to complete. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 224–225

58. d. Customer request

Projects can be authorized as a result of a market demand, organizational need, customer request, technological advance, legal requirement, ecological impact, or a social need. The new industrial park is an example of a project authorized because of a customer request. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 69

59. a. A recommendation for changing current practice should be made and defended.

It is important to capture lessons learned, which then can be used on subsequent projects. The more detailed the lessons the better. However, when it comes to personnel lessons learned, the information should be handled in a confidential manner. [Closing]

Meredith and Mantel 2012, 570

60. c. List of risks requiring near-term responses

The primary outputs from identify risks are initial entries into the risk register. It ultimately contains outcomes of other risk management processes as they are conducted. As an output of identify risks, the risk register should contain a list of identified risks, a list of potential responses, root causes that gave rise to the identified risks, and a structure for describing risks. [Planning]

PMI®, *PMBOK® Guide*, 2013, 327

61. b. David McClelland

According to David McClelland, there are three relevant motives or needs in work situations: the need for achievement, power, and affiliation or association. This theory supports the view that there is a high correlation between achievement, affiliation, and power motives and the overall motivation and performance achieved in a project. [Executing]

Verma 1996, 68

Levin, 2010, 88–91

62. b. Monte Carlo analysis

Simulation is a tool and technique for the develop schedule process by which multiple project durations with different sets of activity assumptions are calculated. Monte Carlo analysis is the most commonly used simulation technique. [Planning]

PMI®, *PMBOK® Guide*, 2013, 180, 340, 562

63. b. Performance measurement baseline

The PMB is an approved, integrated scope-schedule-cost plan for the project work against which project execution is compared in order to measure and manage performance. It includes contingency reserve but not management reserve. It typically integrates scope, schedule, and cost parameters of the project, but it may also include technical and quality parameters. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 302, 549

64. d. Resource breakdown structure

Schedule data for the project schedule includes a number of items as it collects the information used to describe and control the schedule. It includes schedule milestones, schedule activities, activity attributes, and assumptions and constraints. It may include resource histograms, alternate schedules, contingency reserves cash-flow projections, and order and delivery schedules [Planning]

PMI®, *PMBOK® Guide*, 2013, 184, 191, and 561

65. b. Expectancy Theory

Developed by Victor Vroom, Expectancy Theory asserts that people think seriously about how much effort they should put into a task before doing it. Motivation is linked to an expectation of a favorable outcome. It is based on the concept that people choose behaviors that they believe will lead to desired rewards and outcomes. [Executing]

Verma 1996, 73

66. c. Work performance data

Work performance data is an input to control schedule. [Planning]

PMI®, *PMBOK® Guide*, 2013, 185

67. d. Personnel skills

Personnel skill updates are an example of an enterprise environmental factor that may require updates as a result of the manage project team process along with inputs to the organizational performance appraisals. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 285

68. a. Configuration status accounting

Configuration status accounting captures, stores, and accesses the needed configuration information to manage products and product information effectively. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 97

69. c. Final output of creating the WBS is described in terms of verifiable products, services, or results.

By using decomposition, the upper-level WBS components are subdivided for the work for each of the deliverables or subcomponents into its most fundamental elements, where the WBS components then represent verifiable products, service, or results. [Planning]

PMI®, *PMBOK® Guide*, 2013, 131

70. c. The first time management process

The schedule management plan is the output of plan schedule management, the first of the seven time management processes. It is a subsidiary plan to the project management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 143

71. d. Activity name

The components for each activity evolve over time. In the initial stages of the project, they include the activity ID, WBS ID, and the activity name. Later, additional information is added as other time management processes are performed. [Planning]

PMI®, *PMBOK® Guide*, 2013, 153

72. b. An external dependency

Some dependencies are external ones, and they involve a relationship between project activities and nonproject activities. In sequencing activities, the project management team must determine which dependencies are external as they are usually outside of the team's control. [Planning]

PMI®, *PMBOK® Guide*, 2013, 188

73. d. Trend analysis

Trend analysis is used in many control processes in project management. The trend analysis examines the performance of the project over time to determine whether performance is improving or deteriorating. Graphical analysis techniques are valuable in trend analysis to understand performance to date and to compare it to future performance goals in the form of completion dates. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 188

74. c. Carrying out the work

The implementation phase (carrying out the work) is when all interfaces affecting the project must be coordinated and when the product or service of the project is created. In most projects, this phase is also where a large portion of the project budget is spent. [Executing]

PMI®, *PMBOK® Guide*, 2013, 56

75. b. Accommodating

Open subordination is much like an accommodating or smoothing style of conflict management in which negotiators are more concerned about positive relationships than about substantive outcomes. It can dampen hostility, increase support and cooperation, and foster more interdependent relationships. This is an effective style for project managers to use with support staff. It concedes one's position to the needs of others to maintain harmony and relationships. [Executing]

Verma 1996, 157

PMI®, *PMBOK® Guide*, 2013, 283

76. b. Authorized procurement administrator

The buyer, through its authorized procurement administrator, is responsible for providing the seller with formal written notice of contract completion. The procurement administrator does so when the seller has met all contractual requirements as articulated in the contract. [Closing]

PMI®, *PMBOK® Guide*, 2013, 389

77. c. Correspondence

Contract terms and conditions often require written documentation of certain aspects of buyer/seller communications. Examples include any warnings of unsatisfactory performance and requests for changes in the contract or clarification. Other organizational process assets to update include payment schedules and requests and seller performance evaluation documentation. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 386

78. b. Project charter

Although the project charter cannot stop conflicts from arising, it can provide a framework to help resolve them, because it describes the project manager's authority to apply organizational resources to project activities. The project charter also documents the business needs, justification, objectives, and high-level requirements of the project. [Initiating]

Meredith and Mantel 2012, 228–229

PMI®, *PMBOK® Guide*, 2013, 71–72

79. d. Checklists

Checklists are used to verify that the work of the project and its deliverables fulfill a set of requirements. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 242 and 250

80. c. Zero-sum game analysis

Achieving mutual gain during negotiations means that each party benefits by the decisions made. A zero-sum game is where one side wins at the expense of the other. [Executing]

Ward 2008, 474

PMI®, *PMBOK® Guide*, 2013, 517

81. d. Control charts

Control charts help to determine whether or not a process is stable or has predictable performance. This function of control charts is achieved through the graphical display of results over time to determine whether differences in the results are created by random variations or are unusual events. In a manufacturing environment, such charts are used to track repetitive actions such as manufactured lots. In a project management environment, they can be used to monitor processes such as cost and schedule variances, number requirements, and errors in project documents. [Monitoring and Controlling] PMI®, *PMBOK® Guide*, 2013, 238

82. b. Structure

Supportive behavior is relationship oriented and is the extent to which the leader engages in two-way communication, listens, provides support and encouragement, facilitates interaction, and involves the followers in decision making. Structure connotes a certain level of rigidity and inflexibility and is not a term associated with supportive behavior. [Executing] Verma 1996, 216–217
Kerzner, 2009, 222–223

83. d. A defined integrated change control process

If the recommended corrective or preventive actions or a defect repair require a change to any of the project management plans, a change request should be prepared in conformance with the perform integrated change control process. [Monitoring and Controlling] PMI®, *PMBOK® Guide*, 2013, 253

84. a. Help anticipate how problems occur

Flowcharts depict the interrelationship of a system's components and show the relationships among process steps. They are often referred to as process maps as they display the sequence of steps and the branching possibilities for a process that transforms one or more inputs into one or more outputs. Flowcharts show activities, decision points, branching loops, parallel paths, and the order of processing. As such, they aid the team in anticipating where quality problems might occur, which helps in developing approaches for dealing with these potential problems. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 236

85. a. Change master

During the execution stage, the major attributes and emphasis is on realignment. The leadership style/blend that is most appropriate is one who is a decision maker, balances work and fun, is trustworthy, and promotes the team concept and synergy. [Executing]

Verma 1996, 225

86. c. Adjusting leads and lags

Corrective action is anything that brings expected future schedule performance in line with the project plan. Adjusting leads and lags is one of many tools available to identify the cause of variation. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 190

87. d. Defect repair

Defect repair is an intentional activity to modify a nonconforming product or project component. [Executing]

PMI®, *PMBOK® Guide*, 2013, 81

88. c. The person who formally authorizes the project

The charter is issued by the project initiator or sponsor who formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 71

89. a. Smoothing

Smoothing emphasizes areas of agreement while avoiding points of disagreement. It tends to keep peace only in the short term. [Executing]

Adams et al. 1997, 181–189

Verma 1996, 118

PMBOK® Guide, 2013, 283

90. c. Does not require 100% inspection of the components to achieve a satisfactory inference of the population

The application of the statistical concept of probability has proven, over many years in many applications, that an entire population of products need not be inspected, if the sample selected conforms to a normal distribution of possible outcomes (the “bell” curve). Sample frequency and sizes should be determined as the quality management plan is prepared in order that the cost of quality includes the number of tests and expected scrap. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 240 and 252

91. c. Use a control chart

A control chart is one of the seven basic tools of quality control that determines whether or not a process is stable or has predictable performance. It also illustrates how a process behaves over time. When a process is within acceptable limits, it need not be adjusted; when it is outside acceptable limits, an analysis should be conducted to determine the reasons why. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 238

92. c. It is used primarily for Level 1 of the WBS

Estimates are categorized according to accuracy and the time to prepare them. Grassroots or engineering-type estimates are definite estimates and are prepared when detailed information about the project is available. These estimates would use the work-package level of the WBS. [Planning]

Kerzner 2009, 574

PMI®, *PMBOK® Guide*, 2013, 201

93. a. Cost management plan

The management and control of costs focuses on variances. Certain variances are acceptable, and others, usually those falling outside a particular range, are unacceptable. The actions taken by the project manager for all variances are described in the cost management plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 198–199

94. c. Norming; high supportive and low directive approach

There are four stages of team development: forming, storming, norming, and performing. Different leadership styles in terms of the amount of required supportive and directive behavior are appropriate when a team is in a certain development stage. At the norming stage, the third stage in team development, leaders provide high support and low direction. [Executing]

Verma 1996, 227

PMI®, *PMBOK® Guide*, 2013, 276

95. a. The procurement administrator is reassigned

The close procurements process looks at the administration of the contract and not the people responsible or involved with the contract. [Closing]

PMI®, *PMBOK® Guide*, 2013, 387

96. a. Histogram

In a histogram, or a special form of bar chart, each column represents an attribute or characteristic of a problem or situation. The height of each column represents the relative frequency of the characteristic. It describes the central tendency, dispersion, or shape of a statistical distribution. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 238

97. a. Estimate costs

The estimate activity resources process involves estimating the type and quantities of material, people, equipment, or supplies needed to perform each activity. This means close coordination with the estimate costs process is needed. [Planning]

PMI®, *PMBOK® Guide*, 2013, 141, 162

98. a. Legitimate

Legitimate power is formal authority based on a person's position within the organization. It comes with the right to give orders or make requests. [Executing]

Adams et al. 1997, 174–180

Verma 1996, 233

Levin 2010, 161–162

99. a. Role ambiguity

The main sources of stress are grouped into four categories of stress-creating factors: those related to roles and relationships, those related to the job environment, personal factors, and factors related to the project environment or climate. Role ambiguity is an example of factors related to roles and responsibilities. It occurs when an individual is not clear about his or her job responsibilities. [Monitoring and Controlling]

Verma 1996, 180, 183–184; Levin, 2010, 176–183

100. d. The buffer needed and the buffer remaining

Critical chain is an approach in scheduling in which the project team can place buffers on any project schedule path to account for limited resources and project uncertainties. During a performance review, comparing the amount of buffer remaining to the amount of buffer needed to protect the delivery date can help to determine schedule status. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 180, 189

101. b. The resource pool can be limited to those people who are knowledgeable about the project

Resource calendars are an input to the estimate activity resource process and to the estimate activity durations process. They are used to estimate resource use. Early in a project, the resource pool might include people at different levels of expertise in large numbers, but as the project progresses, the resource pool then can be limited to those people who are knowledgeable about the project because of their work on it. [Planning]

PMI®, *PMBOK® Guide*, 2013, 163, 167–168

102. d. Bottom-up estimating

When an activity cannot be estimated with a reasonable degree of confidence, the work then needs to be decomposed into more detail. The estimates then are aggregated into a total quantity for each of the activity's resources through a bottom-up approach. These activities may or may not have dependencies between them. However, when dependencies exist, this pattern of use of resources then is documented in the estimated requirements for each activity. [Planning]

PMI®, *PMBOK® Guide*, 2013, 164

103. a. Review work performance information

The calculated SV and SPI time performance indicators for WBS components, in particular the work packages and control accounts, are documented and communicated to stakeholders as an output of the control schedule process. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 190

104. a. Who will do the task

In a matrix environment, project resources (that is, people) come from the functional departments. Therefore, it is the functional manager's job to identify who will work on specific project tasks. [Executing]

Verma 1995, 56–57

PMI®, *PMBOK® Guide*, 2013, 37

105. b. Net present value of the inflow is greater than the specified amount or percentage threshold

The discounted cash-flow approach—or the present value method—determines the net present value of all cash flow by discounting it by the required rate of return. The impact of inflation can be considered. Early in the life of a project, net cash flow is likely to be negative because the major outflow is the initial investment in the project. If the project is successful, cash flow will become positive. [Initiating]

Meredith and Mantel 2012, 51

106. b. Risk register

The monitor and control risks process includes keeping track of those risks on the watch list. Low-priority risks are inputs to the monitor and control risks process and are documented in the risk register. Other inputs that are part of the risk register include identified risks and risk owners, agreed-upon risk responses, control actions to assess the effectiveness of response plans, specific implementation actions, symptoms and warning signs of risk, residual and secondary risks, and the time and cost contingency reserves. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 350

107. a. Project statement of work

The project statement of work describes in a narrative form the products, services, or results that the project will deliver. It references the product scope description as well as the business need and strategic plan. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 68

108. d. Preparing personnel performance evaluations

The project manager, or whoever supervised the work of each individual team member, should prepare the personnel evaluations because they have an intimate understanding of the work performed by the team members. The termination manager focuses instead on the administrative requirements of termination and the environment within which the project will be operating if it is continued in any way. [Closing]

Meredith and Mantel 2012, 564–566

109. b. Parametric estimating

Parametric estimating uses statistical relationships between historical data and other variables to calculate an estimate for activity parameters such as cost, budget, and duration. The activity durations then are determined quantitatively by multiplying the quantity of work to be performed by the labor hours per unit of work. This technique can produce higher levels of accuracy depending on the reliability of the data in the model. [Planning]

PMI®, *PMBOK® Guide*, 2013, 170

110. d. Performing

The performing stage of team development is noted by a theme of productivity. Management skills involve consensus building, problem solving, decision making, and rewarding, with leadership shown through management by walking around, stewardship delegation, mentoring, being a futurist, and being a cheerleader/champion. [Executing]

Verma 1997, 40

PMI®, *PMBOK® Guide*, 2013, 276

111. b. Terms and conditions in the contract

The terms and conditions can prescribe specific procedures for the various ways that a contract could be terminated. [Closing]

PMI®, *PMBOK® Guide*, 2013, 378, 387

112. d. Behavioral-oriented reasons

Behavioral reasons, rather than quantitative reasons, account for more project terminations because it is much more difficult to manage people than things. Issues such as poor morale, poor human relations, poor labor productivity, and no commitment from those involved in the project combine to thwart project success in many industries. [Closing]

Kerzner 2009, 452–453

113. c. Implementation

Regardless of the many terms used across many industries, implementation would be considered a term used in the executing phase in which the work is carried out and done. [Closing]

Kerzner 2009, 69

PMI®, *PMBOK® Guide*, 2013, 39

114. c. Project charter and stakeholder register

The project charter signifies official sanction by top management and starts the planning, or development, phase. This document formally recognizes the existence of the project and provides the project manager with the authority to apply organizational resources to project activities. The stakeholder register is an output of identify stakeholders and also an output during the initiating processes. [Initiating]
PMI®, *PMBOK® Guide*, 2013, 71–72, 398

115. b. Initiator

To initiate something means to get it started. In the project environment, that typically means a task. [Executing]
Verma 1997, 78–79

116. a. A kickoff meeting is recommended

Even if team members already know one another, a kickoff meeting should still be held because the meeting always includes more than meeting team members. Specific expectations for the project can be discussed as well as other important administrative details. It also gives people an opportunity to express their commitment to the project's objectives. [Executing]
Verma 1997, 135
Meredith and Mantel, 2012, 224–225

117. a. Consider every meeting a team meeting, not the project manager's meeting

Team building should be made as important a part of every project activity as possible. Given that there are many meetings on projects, each team member should be made to feel that it is his or her meeting and not just the project manager's meeting. This will foster greater contribution by each team member. [Executing]

Verma 1997, 137

PMI®, *PMBOK® Guide*, 2013, 278

118. c. Influencing

All are useful skills for project managers. In this situation influencing was necessary as the project manager has little or no direct control over team members as they work in a weak matrix. The ability of the project manager to influence stakeholders in a timely basis is critical to project success. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 284

119. b. Realism

A project selection model should reflect the objectives of the company and its managers; consider the realities of the organization's limitations on facilities, capital, and personnel; and include factors for risk—the technical risks of performance, cost, and time as well as the market risk of customer rejection. [Initiating]

Meredith and Mantel 2012, 64–65

120. a. Conduct a risk audit

The risk audit is a tool and technique in the control risks process with two purposes: to assess the effectiveness of risk responses and to evaluate the effectiveness of the risk management process. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 351

121. c. Not be viewed as part of the project life cycle

Projects are efforts that occur within a finite period of time with clearly defined beginnings and ends. Maintenance is ongoing and of an indefinite duration. A maintenance activity, such as revision of an organization's purchasing guidelines, may be viewed as a project but is a separate and distinct undertaking from the initial project that generated it. At this point, the project has been completed, and its deliverables are transferred to operations for implementation. [Initiating]

Frame 2003, 16–17

PMI®, *PMBOK® Guide*, 2013, 13

122. c. Technical performance measurement

Technical performance measurement compares technical accomplishments to date to the project plan's schedule of technical achievement. Deviation, such as less functionality than planned at a key milestone, can help to forecast the degree of success in achieving the project scope. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 352

123. d. Monitor and control project work and control risks

A workaround is a form of corrective action, as it is a response to a threat that has occurred for which a prior response had not been planned or was not effective. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 93, 353, and 567

124. b. Demands

Claims administration is a tool and technique in the control procurements process. When the buyer and seller cannot agree, this is also called claims, disputes, or appeals and should be documented, processed, monitored, and managed throughout the contract life cycle. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 384

125. a. Procurement performance review

These reviews are a tool and technique of the control procurements process, which can include a review of seller-prepared documentation and buyer inspections. They seek to identify performance successes or failures, progress with respect to the contract statement of work and contract noncompliance. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 383

126. a. Add a project buffer

After the critical path is identified using the critical chain method, resource availability is entered and a resource-constrained schedule results. This schedule may have an altered critical path that is known as the critical chain. The critical chain method adds duration buffers that are non-work schedule activities to manage uncertainty. To protect the target finish date from slippage on the critical chain, a project buffer is placed at the end of the critical chain. [Planning]

PMI®, *PMBOK® Guide*, 2013, 178

127. a. Concept

The greatest degree of uncertainty about the future is encountered during the concept phase or at the start of the project. The direction of the project is determined in this phase, and the decisions made have the greatest influence on scope, quality, time, and cost of the project. [Initiating]

Wideman 1992, II-1

PMI®, *PMBOK® Guide*, 2013, 40

128. c. Tight matrix

A “tight” matrix refers to team members working in close proximity to one another. Studies have demonstrated that such a team approach facilitates concurrent engineering by having designers working next to manufacturing engineers, for example, to help ensure that the project is designed in such a manner that it is also cost-effective to manufacture. [Executing]

Verma 1997, 169

PMI®, *PMBOK® Guide*, 2013, 277

129. b. Consultation

Project managers tend to use four basic decision styles: command, consultation, consensus, and coin flip or random. If acceptance and quality are both important, the consultation style is preferred. It allows for some involvement of team members but allows project managers to maintain control over the final decision. In this style, team members are free to express their opinions, but the project manager makes the final decision. [Executing]

Verma 1997, 178

PMI®, *PMBOK® Guide*, 2013, 516

130. d. As an input to develop project charter

Historical information is an organizational process asset in the develop project charter process. Other organizational process assets are organizational standard processes, policies, and process definitions; templates from other project charters; and the lessons learned data base. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 70

131. d. Direct and manage project work

Work performance data containing these examples are an output of direct and manage project work. They are raw observations and measurements identified as activities are being performed to complete the work of the project. These data often are viewed at the lowest level of detail from which information is derived by other processes. The data then are gathered as the work is done and passed to the controlling processes of the various processes for further analyses. [Executing]

PMI®, *PMBOK® Guide*, 2013, 85

132. d. Forcing

Forcing, using power or dominance, implies the use of position power to resolve conflict. It involves imposing one viewpoint at the expense of another. Project managers may use it when time is of the essence, when an issue is vital to the project's well-being, or when they think they are right based on available information. Although this approach is appropriate when quick decisions are required or when unpopular issues are an essential part of the project, it puts project managers at risk. [Executing]

Adams et al. 1997, 181–189

Verma 1996, 157

PMI®, *PMBOK® Guide*, 2013, 283

133. c. Managing remaining buffer durations against the remaining durations of task chains

The purpose of the critical chain method is to modify the project schedule to account for limited resources. The schedule is built using duration estimates with required dependencies and defined constraints as inputs. Then, the critical path is calculated and resource availability is entered, which means there is a resource-limited schedule with an altered critical path. Buffers protect the critical chain from slippage, and the size of each buffer accounts for the uncertainty in the duration of the chain of dependent tasks that lead up to the buffer. This method then focuses on managing the remaining buffer durations against the remaining duration of task chains.

[Planning]

PMI®, *PMBOK® Guide*, 2013, 178

134. d. Expert

Expert power is earned/personal power when project personnel admire an individual's skills and want to follow him or her as a role model. In such situations, people willingly comply with the demands of such a person. [Executing]

Adams et al. 1997, 174–180

Levin, 2010, 163

135. d. Determine the philosophy and wishes of management

Any selection technique must be evaluated based on the degree to which it will meet the organization's objective for the project. Management generally establishes the organization's objective; therefore, management's wishes must be identified first. Then the most appropriate model to support management's wishes should be selected. [Initiating]

Meredith and Mantel 2012, 62

136. b. Project management plan

Project scope is measured against the project management plan. The project scope statement and scope baseline are subsets of the project management plan. However, the whole plan and all the baselines (cost and schedule) need to be met in addition to part of the scope. The project management plan is the agreement between the project manager and sponsor and defines what constitutes project completion. [Closing]

PMI®, *PMBOK® Guide*, 2013, 102

137. c. Determine the formula for calculating the estimate at completion (EAC) for the project

Three recognized earned value rules of performance measurement are to (1) determine the EAC calculation to be used on the project as tracking methodologies are specified and to provide a validity check on the bottom-up EAC, (2) establish the earned value measurement techniques (for example, weighted milestones, fixed formula or percent complete), and (3) define the WBS level at which the measurements of control accounts will be performed. Four methods can be used to calculate the EAC. [Planning]

PMI®, *PMBOK® Guide*, 2013, 199, 224

138. d. Final product, service, or result transition

All the elements are outputs of the close project or phase processes, but the final product, service, or result transition is not part of the organizational process assets. It is an output on its own and involves the product that the project was created to produce. [Closing]

PMI®, *PMBOK® Guide*, 2013, 103–104

139. b. Acknowledge that conflict exists

In order to address conflict, people must recognize and acknowledge that conflict exists. Next, it is important to establish common ground or shared goals and then to separate people from the problem. [Executing]

Verma 1996, 126

PMI®, *PMBOK® Guide*, 2013, 282–283; 518

140. d. Determine the total float variance

Performance reviews are a tool and technique used in control schedule and includes trend analysis, critical path method, critical chain method, and earned value management. In terms of the critical path method, the emphasis is on comparing progress along the critical path to determine schedule status. Variance on the critical path will have a direct impact on the project's end date; evaluating progress of activities or near critical paths can identify schedule risk. After the variance is known, the project team can take corrective action to bring performance in line with the plan. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 176–177, 188–189

141. a. Group decision-making techniques

Both processes use inspection. Validate scope also uses group-decision making techniques to reach a conclusion when the validation is performed by the project team and other stakeholders. Methods to reach a group decision include: unanimity, majority, plurality, and dictatorship. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 115, 135

142. d. Schedule

In a study of sources of conflict by project life-cycle phase, seven different causes of conflict were identified. In the execution phase, the highest-ranking sources of conflict were schedules, technical issues, and personnel, in this order, followed by priorities, administrative procedures, cost, and personalities. [Executing]

Verma 1996, 103–104

Meredith and Mantel, 2012, 152

143. d. Forcing

Forcing and majority rule are represented by a strong desire to satisfy oneself rather than to satisfy others. It involves imposing one viewpoint at the expense of another and is characterized by a win-lose outcome in which one party overwhelms the other. [Executing]

Adams et al. 1997, 181–189

Verma 1996, 118 and 120

PMI®, *PMBOK® Guide*, 2013, 283

144. a. Operations managers

Operations managers are stakeholders on many projects. They deal with producing and managing the products and services of the organization. On many projects, they are responsible after the project is complete and has been formally handed off to them for incorporating the project into normal operations and providing long-term support for the product. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 12–14, 33

145. a. The choice of media

The choice of media, or the way you deliver the information is as important as what you say. It is important to determine when to communicate in writing versus orally, when to prepare an informal memo or when to use a formal report, and when to communicate face to face or by email, as examples. [Executing]

PMI®, *PMBOK® Guide*, 2013, 298

146. d. Collaborating

Collaborating involves bringing people with opposing views together to reach a solution. When there are too many people involved, it is more difficult to reach a solution, given the multiplicity of perspectives. When the parties involved have mutually exclusive views, forcing or compromise must be used.

[Executing]

Adams et al. 1997, 181–189

Verma 1996, 119

PMI®, *PMBOK® Guide*, 2013, 283

147. c. Stakeholder register

The stakeholder register is the main output of identify stakeholders and contains all the details known at the time related to the stakeholders. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 398

148. c. Change requests

Quality improvements to processes and procedures as well as the project and product will result in a change request that will be reviewed and evaluated to allow full consideration of the recommended improvements using the perform integrated change control process. [Executing]

PMI®, *PMBOK® Guide*, 2013, 247

149. d. Basis of estimates

Basis of estimates is an output from the estimate costs process. [Planning]

PMI®, *PMBOK® Guide*, 2013, 204–210

150. a. Develop project charter

In the develop project charter process, an agreement is an input to define initial intentions for the project. They may take the form of a type of contract such as memorandums of understanding, service level agreements, letter of agreement, letter of intent, verbal agreement, or other written agreements. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 70

151. c. Accepted deliverables

Accepted deliverables is an input to the close project or phase. The other selections are inputs or tools and techniques for other processes. [Closing]

PMI®, *PMBOK® Guide*, 2013, 102

152. d. Scope management plan

The scope management plan is not part of the scope baseline. However, both the scope baseline and the scope management plan are a part of the larger project management plan. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 76–77 and 131–132

153. c. A high-level requirement

The project charter formally authorizes the existence of the project and provides the project manager with the organizational resources for the project activities. Using agile is an example of a high-level requirement, which also is included in the charter. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 71–72

154. c. Note key stakeholders as parties in the contract

Procurement documents are an input to the identify stakeholder process. If the project results from a procurement activity or is based on an established contract, the parties in the contract are key project stakeholders. Others, such as suppliers, are also stakeholders and should be added to the stakeholder list. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 394

155. a. Manage them closely

You must manage them closely. High-power/high-interest stakeholders who do not support your project could have a devastating effect on your project. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 397

156. b. Maintenance requests

Defect repairs, corrective actions, and preventive actions are types of change requests that occur on a project. Maintenance requests typically would be outside the scope of the project itself. [Executing]

PMI®, *PMBOK® Guide*, 2013, 85

157. a. Role

The human resource plan documents roles and responsibilities on the project. A role is the function assumed by or assigned to a person in the project. The court liaison is an example of such a role on a project. [Planning]

PMI®, *PMBOK® Guide*, 2013, 264

158. a. Determine who decides the project is a success

Project approval criteria should be documented in the project charter. These criteria include determining what constitutes success, who decides the project is successful, and who signs off on the project.

[Initiating]

PMBOK® Guide, 2013, 72

159. a. Focus on relationships necessary to ensure success

The project manager has limited time on a project, and his or her time should be used as efficiently and effectively as possible. Therefore, by performing a stakeholder analysis, the project manager can identify the stakeholder relationships that can be leveraged to build coalitions and potential partnerships to enhance project success and to determine relationships that need to be influenced differently at different stages of the project or phase [Initiating]

PMI®, *PMBOK® Guide*, 2013, 395

160. d. High-performing team

This high-performing team is covered in develop project team and obviously is important and necessary. However, regarding quality management other key concepts are prevention over inspection and continuous improvement [Planning]

PMI®, *PMBOK® Guide*, 2013, 229

161. c. Process analysis

Process analysis is used as a tool and technique in perform quality assurance. The tools and techniques used during plan quality management are the seven basic quality tools (cause-and-effect diagrams, flowcharts, checksheets, Pareto diagrams, histograms, control charts, and scatter diagrams), cost-benefit analysis, cost of quality, benchmarking, design of experiments, statistical sampling, additional quality planning tools (brainstorming, force field analysis, nominal group technique, and quality management and control tools, [affinity diagrams, process decision program charts interrelationship diagrams, tree diagrams, prioritization matrices, activity network diagrams, and matrix diagrams]), and meetings. [Planning]

PMI®, *PMBOK® Guide*, 2013, 235–241 and 246–247

162. c. Quality policy

The quality policy includes the overall intentions and the direction of the organization regarding quality and as formally expressed by top management. When the performing organization lacks a formal quality policy or when the project involves multiple performing organizations, as in a joint venture, the project management team must develop a quality policy for the project as an input to its quality planning. [Planning]

PMI®, *PMBOK® Guide*, 2013, 234

163. b. You may need to compensate the seller for seller preparations and for any completed or accepted work

Early termination of a contract is a special case of procurement closure. The rights and responsibilities of the parties are contained in a termination clause of the contract. Typically such a clause allows the buyer to terminate the whole contract or a portion of it for cause or convenience at any time. In doing so, the buyer may need to compensate the seller for seller's preparations and for any completed and accepted work related to the terminated part of the contract. [Executing]

PMI®, *PMBOK® Guide*, 2013, 378, 387

164. d. It includes a specific contract management plan.

A contract management plan is not part of a contract. It is used to identify how the contract will be administered. [Executing]

PMI®, *PMBOK® Guide*, 2013, 357, 382

165. d. Project review meetings

Bidders conferences are meetings with prospective sellers prior to the preparation of a bid or proposal to answer questions and clarify issues. They are a tool and technique in the conduct procurements process. Project review meetings are conducted to assess project performance and status. [Executing]

PMI®, *PMBOK® Guide*, 2013, 375

166. a. Have a meeting

Meetings are another tool and technique in plan procurement management. They are held as research alone may not provide specific information for a procurement strategy without additional information exchange with potential bidders. Through collaborating with potential bidders the organization purchasing the material or service may benefit. Suppliers may benefit to influence a mutually beneficial approach or product. [Planning]

PMI®, *PMBOK® Guide*, 2013, 366

167. c. Project expeditor

A variation of the weak matrix organizational structure, the project expeditor has no formal authority to make or enforce decisions. Nonetheless, the project expeditor must be able to persuade those in authority to maintain the project's visibility so that resources will be allocated as needed to meet the project's schedule, budget, and quality constraints. This approach is considered to be effective in high-technology and research and development environments. [Planning]

Verma 1995, 153–154

PMI®, *PMBOK® Guide*, 2013, 23

168. a. Have the project manager and the functional manager work together to complete performance evaluations

In a matrix environment, project team members have two bosses: the project manager and their functional line manager. People often are unclear as to which manager is their “real” boss, as there may be a continual shifting balance of power. To avoid confusion regarding performance issues, it is a best practice to have the project manager and functional line manager complete the individual’s performance evaluations. Also, greater weight should be given to the project manager’s assessment for the time the individual actually worked on the project. [Planning]

Verma 1995, 178

PMI®, *PMBOK® Guide*, 2013, 33, 266, and 270

169. b. Acquire project team

The resource calendar is an output from the acquire project team process. Other outputs are project staff assignments and updates to the project management plan, especially the human resource management plan. A resource calendar is also an output of the develop human resource plan process as part of the staffing management plan and the conduct procurements process. [Planning]

PMI®, *PMBOK® Guide*, 2013, 265, 271, 378

170. a. Preventive action

As a specific subset of change requests, approved preventive actions are an input to the direct and manage project work process. Such actions are intentional to ensure the future performance of the project work is aligned with the project management plan. [Executing]

PMI®, *PMBOK® Guide*, 2013, 81–82

171. b. Audit project success or failure and archiving records

Administrative closure includes step-by-step methodologies that address: actions and activities necessary to satisfy completion or exit criteria for the phase or the project; actions or activities to transfer the products, services, or results to the next phase or to production or operations; and activities to collect project or phase records, audit success or failure, gather lessons learned, and archive information for future use in the organization. [Closing]

PMI®, *PMBOK® Guide*, 2013, 101

172. d. Understanding of policies, operating procedures, and regulations of external stakeholder organizations

Successful project managers have expertise and skills in all three following areas: leadership/interpersonal, project management/administration, and technical. The understanding of policies, operating procedures, and regulations of external stakeholder organizations is representative of project management/administrative skills, not leadership/interpersonal skills. [Executing]

Verma 1995, 27; PMI®, *PMBOK® Guide*, 2013, Appendix X3

173. a. Adaptive life cycle

The adaptive life cycle is one that is known as change driven or one with agile methods and is set up to respond to change and ongoing stakeholder involvement. This approach differs from iterative and incremental as durations are very rapid and are fixed in time and cost. This approach is preferred in a rapidly changing environment where requirements and scope are difficult to define in advance and when it is possible to define small incremental improvements, which deliver value to stakeholders. [Executing]

PMI®, *PMBOK® Guide*, 2013, 46

174. c. Prepare a staff release plan

The staff release plan determines the method and timing of releasing team members. Morale is improved if there are smooth transitions for the staff to upcoming projects. This staff release plan also helps to mitigate human resource risks that may occur. It is part of the staffing management plan, which is part of the human resource plan. [Planning]

PMI®, *PMBOK® Guide*, 2013, 266

175. d. Analyze each stakeholder's impact or support and classify them

The second step in the stakeholder analysis process is to analyze the potential impact or support each stakeholder could generate and then to classify the stakeholders to define an approach or strategy. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 396

176. b. Select communications technology

Although all four listed are tools and techniques in the manage communications process (another is communications methods), since this project is a virtual one, the choice of technology is an important consideration. It can vary from project to project and throughout the life cycle, but as the project manager the focus is to ensure the choice is important for the information that is communicated.

[Executing]

PMI®, *PMBOK® Guide*, 2013, 300–301

177. d. Storming

During the storming stage, the team is addressing the work, technical decisions, and the project management approach. However, if team members are not collaborating and open to different ideas and perspectives, the environment becomes counter-productive. [Executing]

PMI®, *PMBOK® Guide*, 2013, 276

178. b. A power/influence grid

Although a number of classification models are available to help prioritize the key stakeholders, the power/influence grid groups stakeholders based on their level of authority or power and their active involvement or interest in the project. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 396

179. b. Checklists for risk identification

Checklists are a tool and technique of the identify risks process and include risks encountered on similar, previous projects identified through the lessons learned process. The project team will review the checklist as part of the identify risks process as well as during closeout. To help others in the future, the team will add to the list as necessary based on its experience. [Planning]

PMI®, *PMBOK® Guide*, 2013, 325

180. b. International Organization for Standardization (ISO)

Project quality management is intended to be compatible with International Organization for Standardization quality standards. [Executing]

PMI®, *PMBOK® Guide*, 2013, 228

181. b. All potential sellers are given equal standing

Bidders conferences are conducted to ensure all prospective sellers have a clear and common understanding of the requirements. They are not used to prequalify vendors. Thus, all vendors are treated equally. [Executing]

PMI®, *PMBOK® Guide*, 2013, 375

182. b. Building trust

Building trust helps to build the foundation of the relationship and is a critical component in effective team leadership. Without trust, it is difficult to establish positive relationships with the various stakeholders engaged in the project. If trust is compromised, people will disengage, and collaboration becomes more difficult if not impossible. [Executing]

PMI®, *PMBOK® Guide*, 2013, 407, 517

183. d. Transference

Risk transference is shifting some or all negative impact of a threat and the ownership of the response to the threat to a third party. It does not eliminate the threat posed by an adverse risk. [Planning]

PMI®, *PMBOK® Guide*, 2013, 344

184. a. Terminate procurements

Termination is a word used to define a contract ending through mutual agreement by both parties, the default of one party, or for the convenience of the buyer. [Closing]

PMI®, *PMBOK® Guide*, 2013, 355, 387

185. d. Conduct a procurement audit

The procurement audit attempts to identify successes and failures relative to the procurement process especially in terms of the preparation or administration of other procurement contracts on the project or on other projects in the organization. Uncovering and reporting both successes and failures can contribute to the project management knowledge base and improve the quality of project management services. A procurement audit should be conducted as part of the close procurements process. [Closing]

PMI®, *PMBOK® Guide*, 2013, 388

186. c. Risk urgency assessment

Risks that may occur in the near-term need urgent attention. The purpose of the risk urgency assessment is to identify those risks that have a high likelihood of occurring. Assessing risk urgency can be combined with the risk ranking that is determined from the probability and impact matrix for a final risk severity rating. [Planning]

PMI®, *PMBOK® Guide*, 2013, 333

187. d. Delphi technique

When consensus is necessary, the Delphi technique is a frequently used information gathering technique. A facilitator first sends out a questionnaire to the experts to solicit ideas. The responses then are summarized and returned to the experts for further comment. Consensus generally is reached after a few such rounds. The Delphi technique helps to reduce bias in the data and the undue influence of one person on the outcome. [Planning]

PMI®, *PMBOK® Guide*, 2013, 324

188. b. Verifying compliance in the seller's work processes

Inspections and audits are tools and techniques in the control procurements process. They are required by the buyer and supported by the seller in the procurement contracts and can be conducted as the project is executed to verify compliance in the seller's work processes or deliverables. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 383

189. d. To establish minimum requirements of performance for one or more of the evaluation criteria

Weighting systems are developed and used to help select the best vendor as part of the proposal evaluation techniques. By assigning a numerical weight to each evaluation criteria, the buyer can emphasize one area as being more important than another. These proposal evaluation techniques are a tool and technique in the conduct procurements process. [Executing]

PMI®, *PMBOK® Guide*, 2013, 375

190. a. Hold meetings

Meetings are a tool and technique in the control risks process. Risk management should be an agenda item at periodic status meetings. While the amount of time needed for risk management will vary depending on the identified risks, their priority, and the difficulty of the response, the more often risk management is practiced, the easier it becomes. Frequent discussions about risk make it more likely that risks and opportunities will be identified. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 352

191. c. Your fee is generally not subject to appeals

This contract type reimburses the seller for all legitimate costs, but the majority of the fee is earned only based on the satisfaction of broad subjective performance criteria defined and incorporated in the contract. The fee determination is based on subjective determination of seller performance by the buyer; it generally is not subject to appeals. [Planning]

PMI®, *PMBOK® Guide*, 2013, 364

192. d. A mechanism to communicate and support project decision making is provided

All of the answers are outputs in the control risks process, however, work performance information specifically provides a mechanism to communicate and support project decision making. [Monitoring and Controlling]

PMI®, *PMBOK® Guide*, 2013, 353–354

193. c. Value delivered by vendors meeting the needs

Other factors to consider include the core capabilities of the organization, the risks associated with meeting the need in a cost-effective way, and capability internally compared with the vendor community. [Executing]

PMI®, *PMBOK® Guide*, 2013, 374

194. a. Open items list

Issues or an open item list are examples of inputs if contract negotiation is an independent process. Outputs are documented decisions. While contract negotiations may need to be a separate process for complex procurements, for simple procurement items, the terms and conditions of the contract can be fixed and nonnegotiable. [Executing]

PMI®, *PMBOK® Guide*, 2013, 377

195. a. Plan procurement management

Enterprise environmental factors, which include marketplace conditions that the team needs to be aware of as it develops its plans for purchases and acquisition, are an input to the plan procurement management process. [Planning]

PMI®, *PMBOK® Guide*, 2013, 362

196. b. Program manager

Organizational strategy provides guidance and direction to project management. Portfolio managers, sponsors, or program managers identify alignment or potential conflicts between organizational strategies and project goals and communicates them to the project manager. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 15

197. c. Expert judgment and some form of proposal evaluation techniques

Expert judgment is a tool and technique used in the conduct procurements process. It, along with some form of proposal evaluation techniques as developed during the plan procurements process and noted as source selection criteria, is used to rate and score proposals. This does not preclude the use of other tools and techniques, but these tools and techniques are used in all evaluations. [Executing]

PMI®, *PMBOK® Guide*, 2013, 375–376

198. a. Sender-receiver models

Sender-receiver models incorporate feedback loops to provide opportunities for interaction/participation and remove barriers to communication. [Executing]

PMI®, *PMBOK® Guide*, 2013, 298

199. a. Seven percent

Albert Mehrabian, a researcher, discovered that words alone account for just seven percent of any message's impact. Vocal tones account for 38 percent of the impact and facial expressions account for 55 percent of the message. Thus, project managers should use nonverbal ingredients to complement verbal message ingredients whenever possible and should recognize that nonverbal factors generally have more influence on the total impact of a message than verbal factors. The lack of nonverbal cues makes project communications in a virtual environment more challenging. [Executing]

Verma 1996, 19

200. a. Periodically review the business case

The business case is an input to the develop project charter process. On a multi-phase project, it should be reviewed periodically to ensure the project is on track to deliver the business benefits. [Initiating]

PMI®, *PMBOK® Guide*, 2013, 69

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