PROJECT MANAGEMENT

PMP® Certification Training

Lesson 11: Project Resource Management

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Objectives

▷ Define Project Resource Management

▷ Differentiate between functional manager and project manager

▷ Describe the Project Resource Management processes

▷ Identify the stages of team formation, powers of project manager, and conflict management techniques

▷ Explain organization theories

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Project Resource Management

The definition of *Project Resource Management is as follows:

> Project resource management includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project.

- Project team is composed of people with assigned roles and responsibilities for completing the project.

- Physical resources are any tools, equipment, or property necessary for the project.

- Team resources include people (employees and contractors) working together to manage the project effort.

Functional Manager vs. Project Manager

The differences between functional and project managers are as follows:

Functional Manager	Project Manager
• Functional manager handles a business function; Example: HR, Engineering, etc. • Functional managers are subject matter experts. • Organization structure and the organization's products define the roles and responsibilities of a functional manager. • Functional manager is the owner of resources and assigns specific individuals to the project team.	• Project managers are accountable and responsible for a project and its quality. • Project managers are not technical experts. • Organization's structure defines the degree of authority of a project manager. • Project managers need to negotiate with the functional managers to procure project resources. • Project managers are responsible for product quality and credit the team with project success.

If a company initiates a project of securing the ISO 9001:2008 certification, the project will require team members from different departments. The project manager has to request the functional managers to assign team members from their teams. Resources are released back to their functions once the project is completed.

Key Concepts

- Project manager should invest suitable effort in acquiring, managing, motivating, and empowering the project team.

- Project manager should be both leader and manager of the project team.

- Project manager should be aware of:

    - Team environment

    - Geographical locations of the team members

    - Communication among stakeholders

    - Organizational change management

    - Internal and external politics

    - Cultural issues and organizational uniqueness

    - Other factors that may alter project performance

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition*, Project Management Institute, Inc., 2017, Page 309

Trends and Emerging Practices in Project Resource Management

- **Resource management methods**—Just-in-time (JIT), Kaizen, Total Productive Maintenance (TPM), Theory of constraints (TOC)

- **Emotional intelligence (EI)**—Project manager should invest in personal EI by improving inbound and outbound competencies.

- **Self-organizing teams**—Teams should be able to function in the absence of centralized control.

- **Virtual teams/distributed teams**—Globalization of projects has promoted the need for virtual teams that work on the same project but are not colocated at the same time.

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Tailoring Considerations

Diversity — What is the diversity background of the team?

Physical location — What is the physical location of team members and physical resources?

Industry-specific resources — What special resources are needed in the industry?

Acquisition of team members — How will team members be acquired for the project? Are team resources full-time or part-time on the project?

Management of the team — How is the team development managed for the project? Are there organizational tools to manage team development or will new ones need to be established?

Life cycle approach — What life cycle approach will be used on the project?

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Considerations for Agile/Adaptive Environments

Projects with high variability benefit from team structures that maximize focus and collaboration, such as self-organizing teams with generalizing specialists.

Collaboration is intended to boost productivity and facilitate accelerated integration of distinct work activities, improve communication, increase knowledge sharing, and provide flexibility of work assignments in addition to other advantages.

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Project Resource Management Processes

Knowledge Areas			Project Integration Management	Project Scope Management	Project Schedule Management	Project Cost Management	Project Quality Management	Project Resource Management	Project Communications Management	Project Risk Management	Project Procurement Management	Project Stakeholder Management
Project Management Process Groups		**Initiating**	4.1 Develop Project Charter									13.1 Identify Stakeholders
		Planning	4.2 Develop Project Management Plan	5.1 Plan Scope 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS	6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule	7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget	8.1 Plan Quality Management	9.1 Plan Resource Management 9.2 Estimate Activity Resources	10.1 Plan Communications Management	11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Response	12.1 Plan Procurement Management	13.2 Plan Stakeholder Engagement
		Executing	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge				8.2 Manage Quality	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	10.2 Manage Communications	11.6 Implement Risk Response	12.2 Conduct Procurements	13.3 Manage Stakeholder Engagement
		Monitoring and Controlling	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	5.5 Validate Scope 5.6 Control Scope	6.6 Control Schedule	7.4 Control Costs	8.3 Control Quality	9.6 Control Resource	10.3 Monitor Communications	11.7 Monitor Risks	12.3 Control Procurements	13.4 Monitor Stakeholder Engagements
		Closing	4.7 Close Project or Phase									

Table 1-4. Project Management Process Group and Knowledge Area Mapping

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition,* Project Management Institute, Inc., 2017, Page 25

Plan Resource Management

"Plan Resource Management is the process of defining how to estimate, acquire, manage, and use team and physical resources." This process is part of the Planning Process Group.

PROJECT RESOURCE MANAGEMENT

Input	Planning Process	Output
Project Charter		Resource Management Plan
Project management plan	**Plan Resource Management**	Team Charter
Project Documents		Project Document Updates
Enterprise environmental factors		
Organizational process assets		

Tools & Techniques:
- Expert Judgment
- Data Representation
- Organizational theory
- Meetings

Legend
- Input
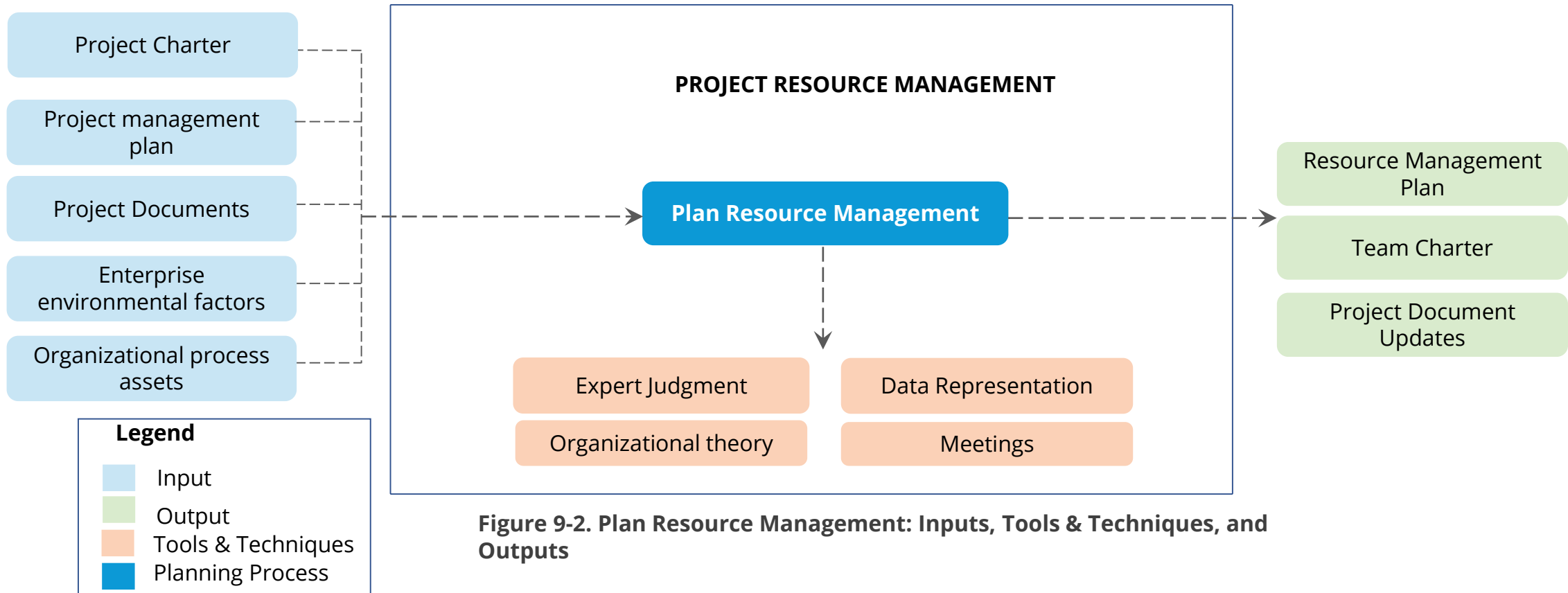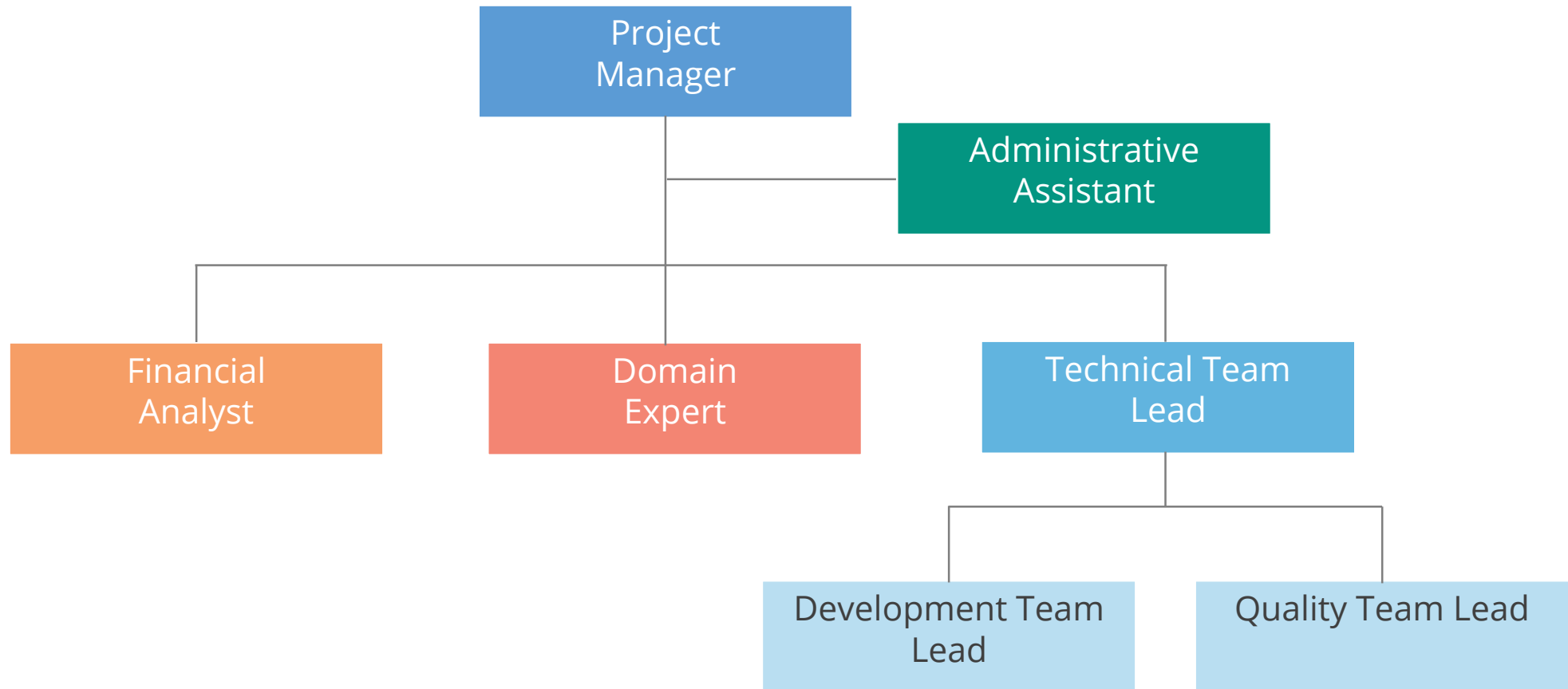- Output
- Tools & Techniques
- Planning Process

Figure 9-2. Plan Resource Management: Inputs, Tools & Techniques, and Outputs

Organization Charts and Role Descriptions

A Project manager has to ensure that an organizational chart is prepared for every project to identify the roles and reporting relationships.

```
                    ┌─────────────────┐
                    │     Project     │
                    │     Manager     │
                    └─────────────────┘
                             │          ┌──────────────────┐
                             │          │  Administrative  │
                             ├──────────│     Assistant    │
                             │          └──────────────────┘
          ┌──────────────────┼──────────────────┐
┌─────────────────┐ ┌─────────────────┐ ┌─────────────────┐
│    Financial    │ │      Domain     │ │  Technical Team │
│     Analyst     │ │      Expert     │ │      Lead       │
└─────────────────┘ └─────────────────┘ └─────────────────┘
                                         ┌───────┴───────┐
                              ┌─────────────────┐ ┌─────────────────┐
                              │ Development Team │ │ Quality Team Lead│
                              │      Lead        │ │                  │
                              └─────────────────┘ └─────────────────┘
```

Responsibility Assignment Matrix

Responsibility Assignment Matrix (RAM) is used to define project responsibilities among the project team.

RACI charts are a form of RAM. RACI stands for:

- Responsible
- Accountable
- Consulted
- Informed

For every project deliverable, RACI charts identify who is responsible, accountable, consulted, and needs to be informed.

There can only be one Accountable (A) in each row of a RACI.

Activity	John	Kris	Sally	Ting
Project Plan	A	R	R	R
Configuration Management	C	A	R	R
Test Plan	C	R	A	R
Design	C	I	R	A
Team Budget	C	A	R	R
Customer Liaison	A	C	R	I
Team Building	R	R	A	C
Activity	A	R	R	R

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Resource Histogram

Resource histograms are used to represent the resources required through the life of a project.
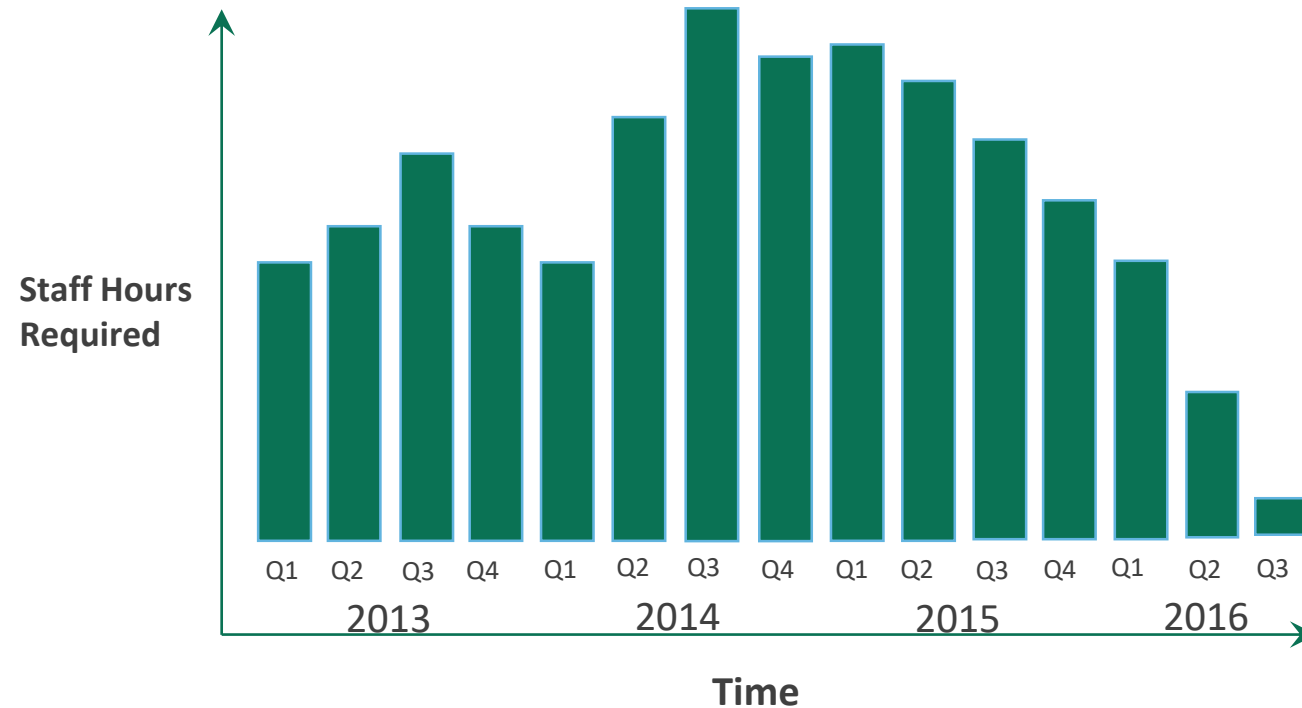
- For long term projects, staffing requirements can vary over different project phases.
- Based on these estimates, a project manager can develop the resource hiring strategy.

Estimate Activity Resources

"Estimate Activity Resources is the process of estimating team resources and the type and quantities of materials, equipment, and supplies necessary to perform project work." This process belongs to the Planning Process Group.
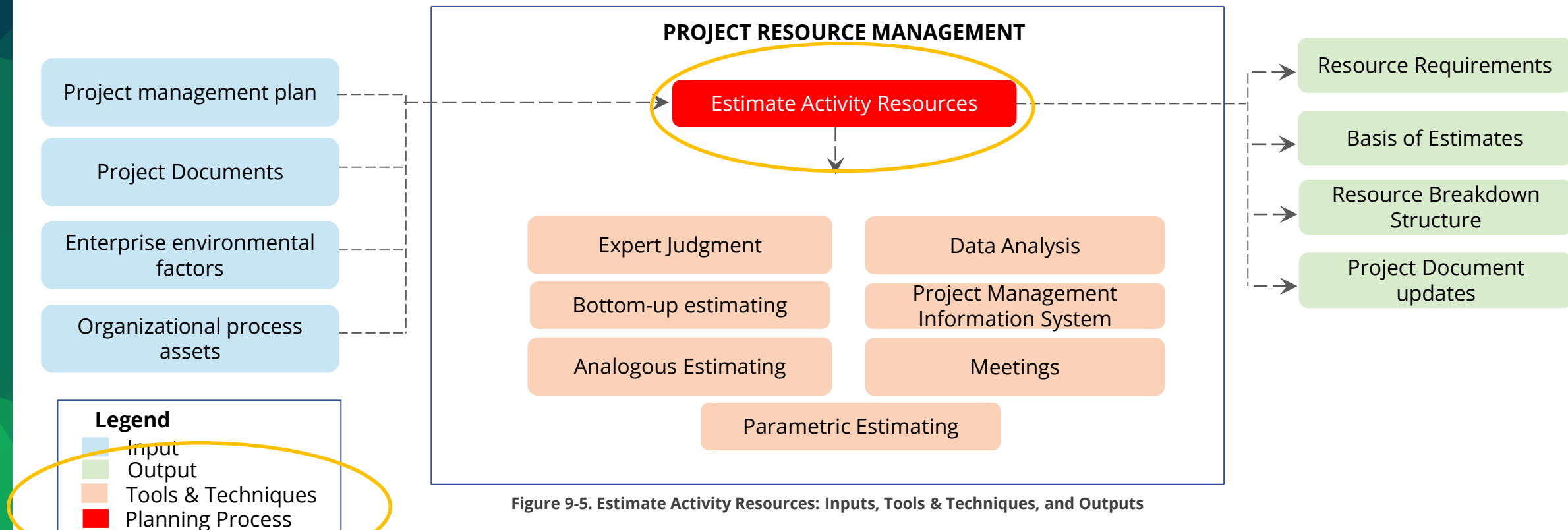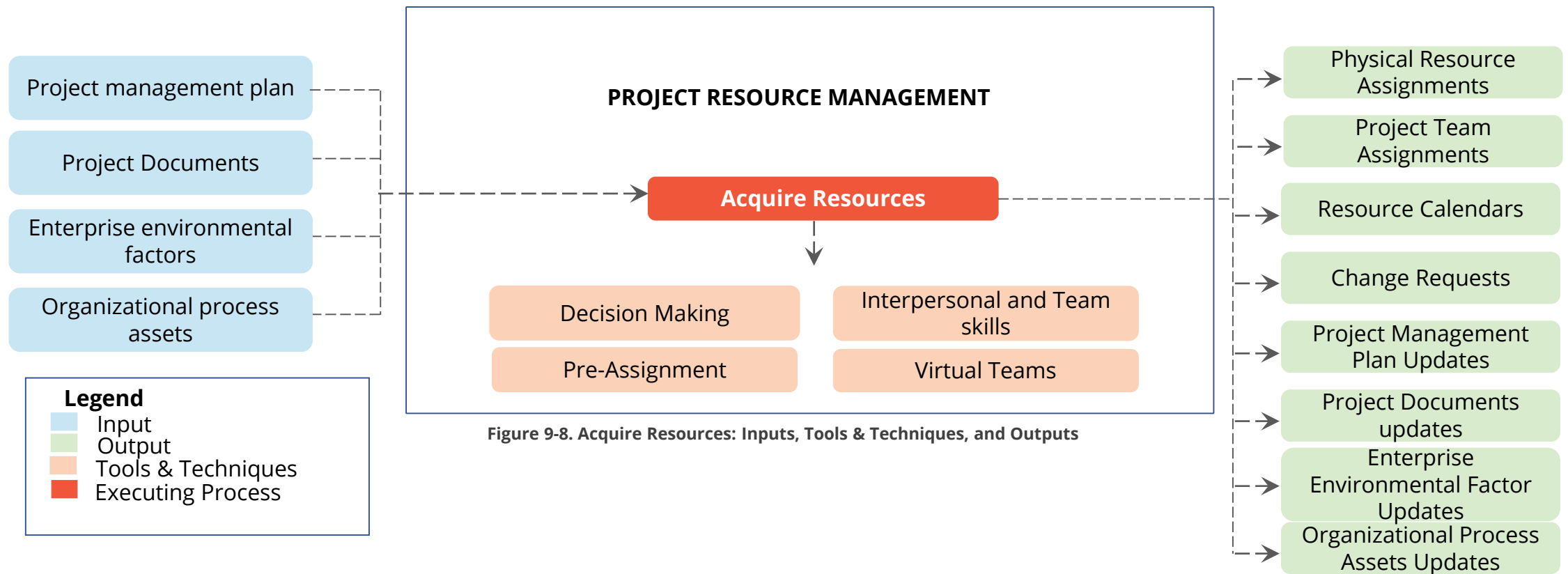
PROJECT RESOURCE MANAGEMENT

Project management plan

Project Documents

Enterprise environmental factors

Organizational process assets

Estimate Activity Resources

Expert Judgment

Bottom-up estimating

Analogous Estimating

Data Analysis

Project Management Information System

Meetings

Parametric Estimating

Resource Requirements

Basis of Estimates

Resource Breakdown Structure

Project Document updates

Legend
- Input
- Output
- Tools & Techniques
- Planning Process

Figure 9-5. Estimate Activity Resources: Inputs, Tools & Techniques, and Outputs

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Acquire Resources

"Acquire Resources is the process of obtaining team members, facilities, equipment, materials, supplies, and other resources necessary to complete the project work." This process belongs to the Executing Process Group.

PROJECT RESOURCE MANAGEMENT

Inputs:
- Project management plan
- Project Documents
- Enterprise environmental factors
- Organizational process assets

Acquire Resources

Tools & Techniques:
- Decision Making
- Pre-Assignment
- Interpersonal and Team skills
- Virtual Teams

Outputs:
- Physical Resource Assignments
- Project Team Assignments
- Resource Calendars
- Change Requests
- Project Management Plan Updates
- Project Documents updates
- Enterprise Environmental Factor Updates
- Organizational Process Assets Updates

Legend
- Input
- Output
- Tools & Techniques
- Executing Process

Figure 9-8. Acquire Resources: Inputs, Tools & Techniques, and Outputs

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Develop Team

"Develop Team is the process of improving competencies, team member interaction, and overall team environment to enhance project performance." This process belongs to the Executing Process Group.
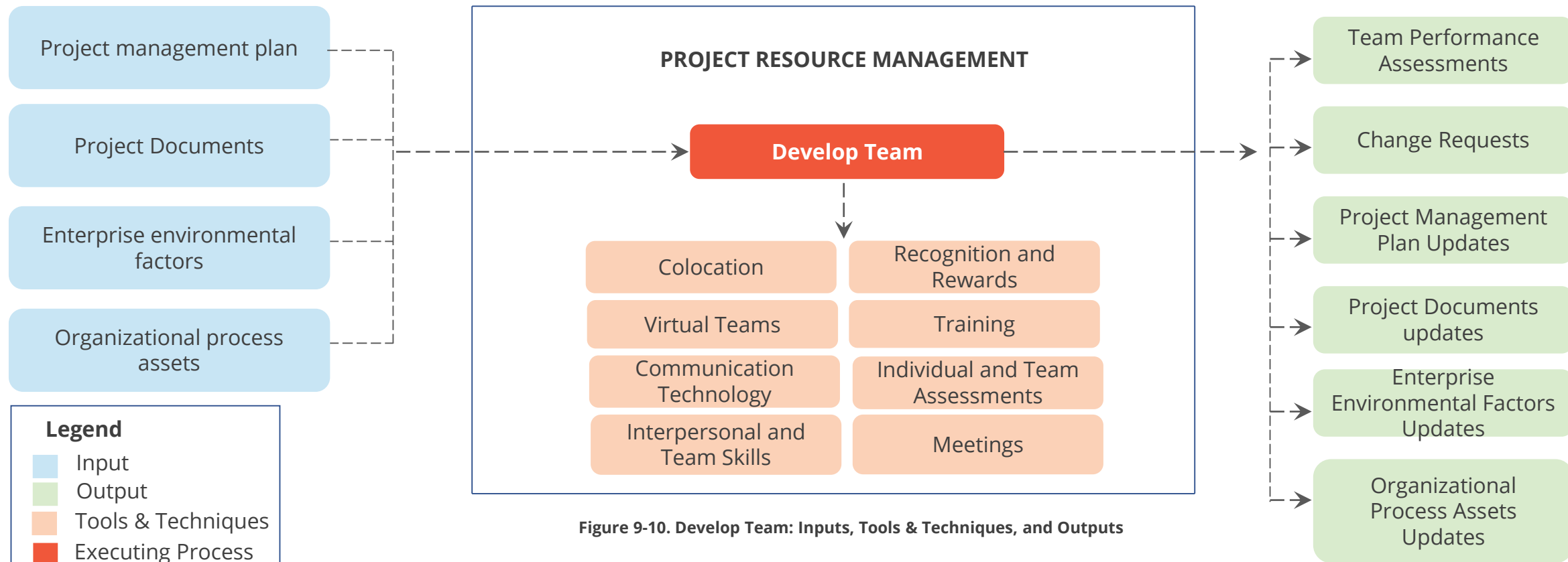
PROJECT RESOURCE MANAGEMENT

Inputs
- Project management plan
- Project Documents
- Enterprise environmental factors
- Organizational process assets

Develop Team

Tools & Techniques
- Colocation
- Virtual Teams
- Communication Technology
- Interpersonal and Team Skills
- Recognition and Rewards
- Training
- Individual and Team Assessments
- Meetings

Outputs
- Team Performance Assessments
- Change Requests
- Project Management Plan Updates
- Project Documents updates
- Enterprise Environmental Factors Updates
- Organizational Process Assets Updates

Legend
- Input
- Output
- Tools & Techniques
- Executing Process

Figure 9-10. Develop Team: Inputs, Tools & Techniques, and Outputs

Questions that test a project manager's role in developing a project team can be expected in the exam.

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition*, Project Management Institute, Inc., 2017, Page 336

Manage Team

"Manage Team is the process of tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance." This process belongs to the Executing Process Group.
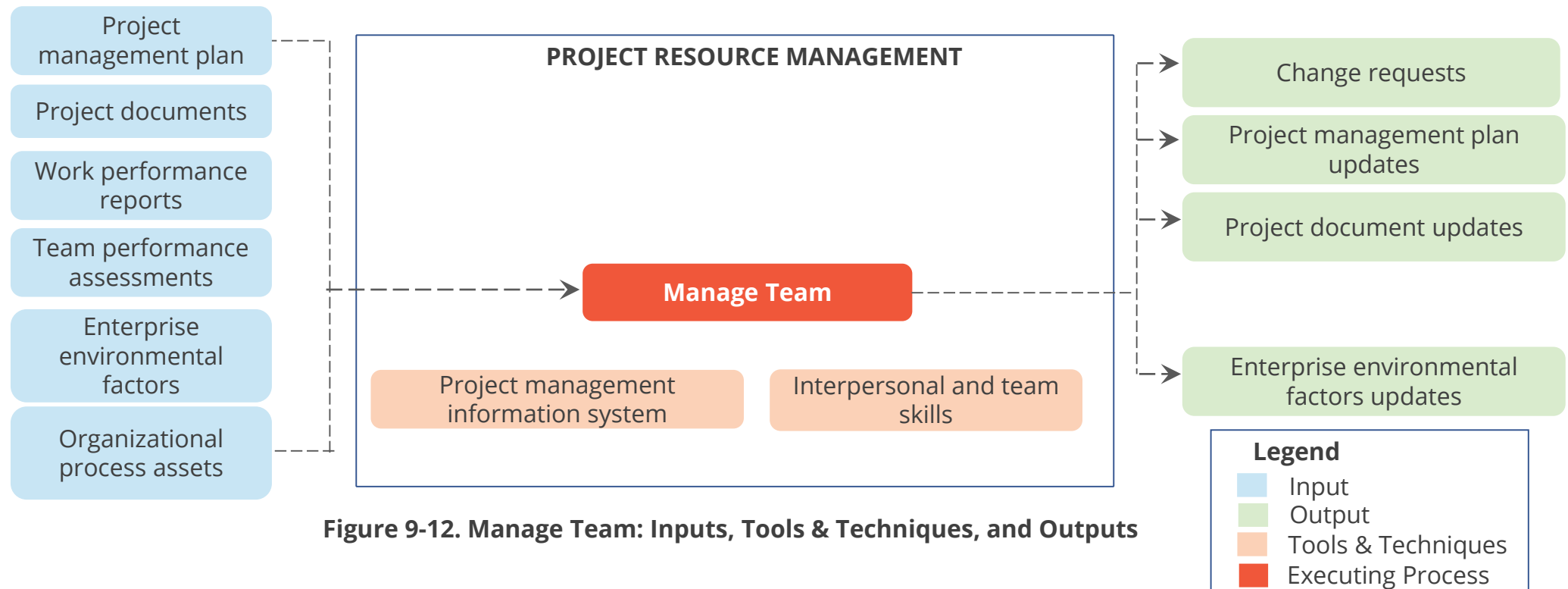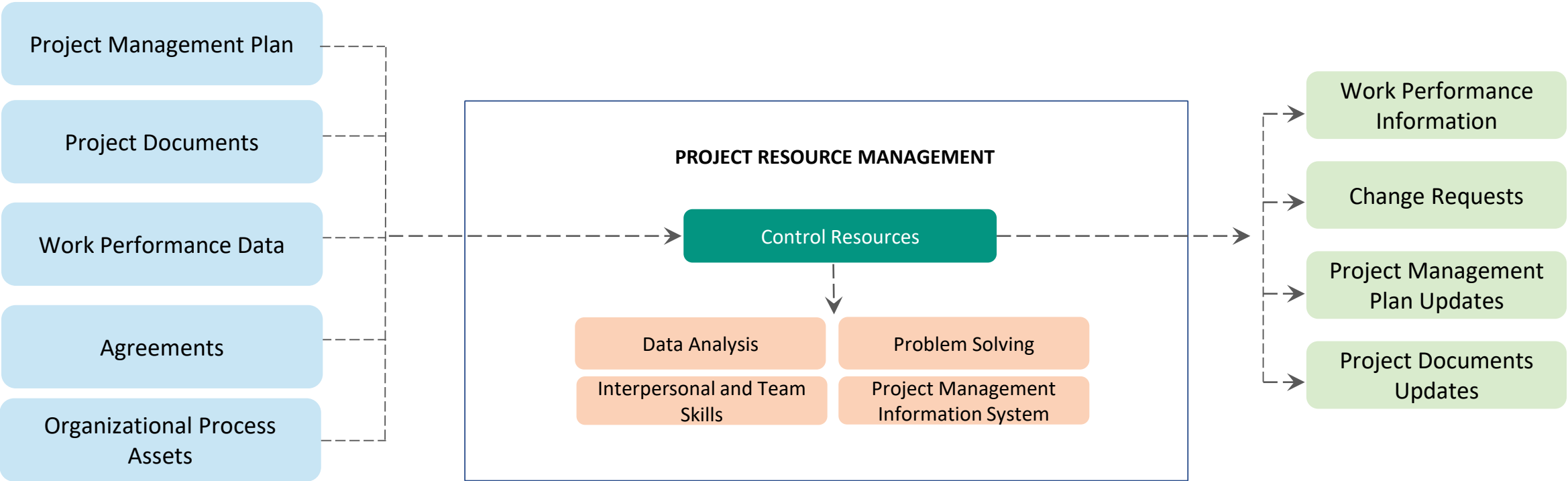
PROJECT RESOURCE MANAGEMENT

Inputs:
- Project management plan
- Project documents
- Work performance reports
- Team performance assessments
- Enterprise environmental factors
- Organizational process assets

Manage Team

Tools & Techniques:
- Project management information system
- Interpersonal and team skills

Outputs:
- Change requests
- Project management plan updates
- Project document updates
- Enterprise environmental factors updates

Legend
- Input
- Output
- Tools & Techniques
- Executing Process

Figure 9-12. Manage Team: Inputs, Tools & Techniques, and Outputs

Questions that test a project manager's skill in managing a project team can be expected in the exam.

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition,* Project Management Institute, Inc., 2017, Page 345

Control Resources

"Control resources is the process of ensuring that the physical resources assigned and allocated to the project are available as planned, as well as monitoring the planned versus actual utilization of resources and taking corrective action as necessary." This process belongs to the Monitoring and Controlling Process Group.

Inputs:
- Project Management Plan
- Project Documents
- Work Performance Data
- Agreements
- Organizational Process Assets

PROJECT RESOURCE MANAGEMENT

Control Resources

Tools & Techniques:
- Data Analysis
- Problem Solving
- Interpersonal and Team Skills
- Project Management Information System

Outputs:
- Work Performance Information
- Change Requests
- Project Management Plan Updates
- Project Documents Updates

Legend
- Input
- Output
- Tools & Techniques
- Monitoring and Controlling Process

The key benefit of this process is ensuring that the assigned resources are available to the project at the right time and in the right place.

Team Dynamics

Dr. Bruce Tuckman's (1965) Stages of team formation are as follows:

Forming	Storming	Norming	Performing	Adjourning
The team formally comes together.	The team may have disagreements.	Trust develops within the team.	The team starts delivering results.	The team is disseminated after project completion.

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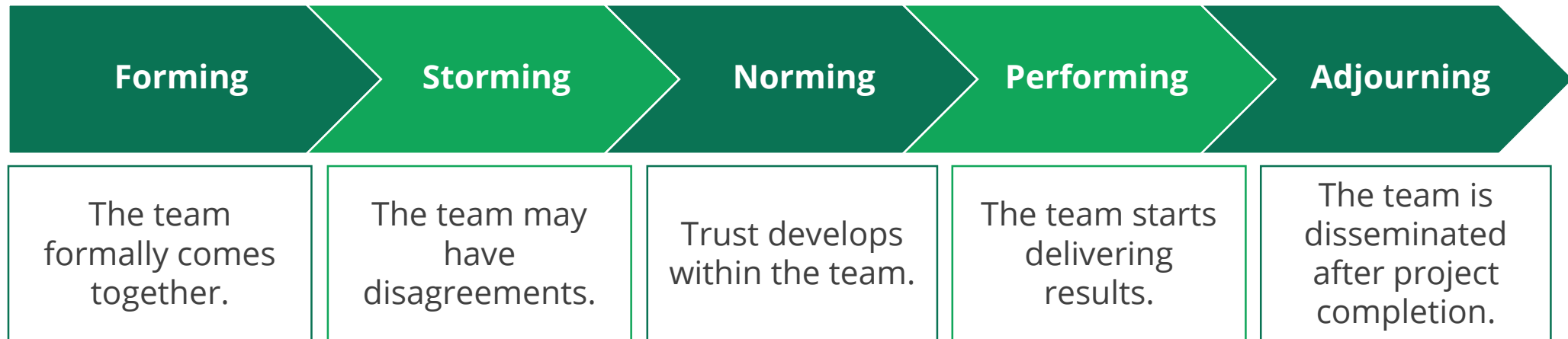
Conflict Management

Conflict is an inevitable consequence of organizational interactions. If conflicts are managed well, they can create opportunities for improvement.

The sources of conflict are as follows:

- Scarce Resources
- Scheduling Priorities
- Personal Work Styles
- Expertise and Experience Levels
- Communication Issues
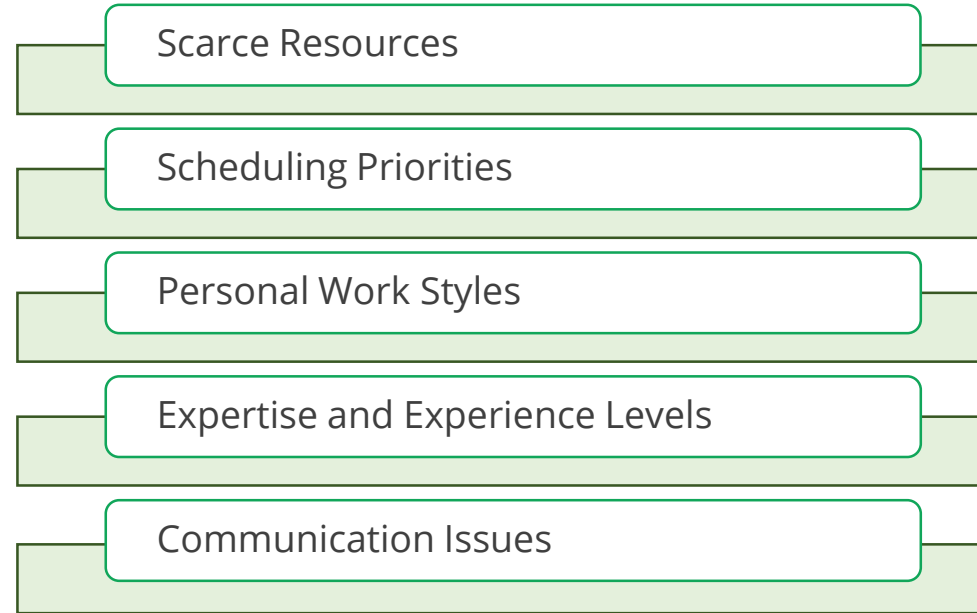
The best way to resolve conflict is to discuss and clarify with the parties involved in it.

Business scenario based questions on conflict management can be expected in the exam.

Conflict Management (Contd.)

A project manager needs to be actively involved in the project processes to minimize and avoid conflicts.

The following are some measures that a project manager can take to avoid conflicts:

- Provide all details of the project and keep the team informed of the exact project status.

- Assign the work such that there are no overlapping tasks.

- Motivate the team and ensure everyone gets to work on interesting and challenging assignments.

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Conflict Resolution Techniques

The five conflict resolution techniques are as follows:

Withdraw or Avoid

Resolution to the conflict is deferred to a later time.

Compromise or Reconcile

A certain degree of satisfaction is brought to all the parties involved.

Smooth or Accommodate

Areas of agreement are emphasized to reduce the conflict.

Force or Direct

Directions are given by a person in authority to resolve the conflict.

Collaborate or Problem Solve

All the parties are asked to jointly look for a resolution.

Business scenario based problems where a resolution technique has to be selected can be expected in the exam.

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Business Scenario: Problem Statement

- Tanya is the project manager for a manufacturing project in a highly regulated industry.
- With the varying environment factors that govern the practices of the company, the room for error is very small. Tanya's project can have some major impact on several areas within the company.
- To strengthen the team's ability to deliver the project adequately without any infractions, the top players in those areas are selected to join Tanya's project team. This decision proves to be helpful.
- A conflict arises between a stakeholder and one of the team members regarding how a task can be completed without violating government regulations.
- Tanya has to meet with the team member and stakeholder to defuse the situation and resolve the conflict. What is the most effective approach?

Business Scenario: Solution

- Tanya should get all parties to focus on the end goal and persuade them to reach a consensus to meet their commitment.
- After redirecting their energy to the customer's needs and their points of agreement, Tanya should convince both sides to pull together and collaborate with one another to pick an approach that presents a win-win scenario.

Powers of the Project Manager

A project manager is vested with certain powers to facilitate project work from the team members.

Legitimate or Formal
- Formally assigns the tasks to the team members

Reward
- Can reward and recognize the team members based on their performance

Penalty
- Can penalize the team members for poor performance

Expert
- Can command authority by the virtue of their expertise in the domain

Referent
- Can be considered as a reference of higher authority to get the work done

! Reward and expert are usually the best forms of authority to use. Penalty should be resorted to only as a last option.

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Business Scenario: Problem Statement

- Robert is leading a major project initiative for his company. This project is very intense and critical to the business. It will require all hands on deck.

- Robert is task-driven and takes a no-nonsense approach. As a result, some project team members are afraid of him. They view Robert as someone who could damage their career, bonus potential, and work opportunities.

- Because of this mentality, Robert's next team meeting is unproductive, and there is debate around who is responsible for the activities. How should Robert handle this?

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Business Scenario: Solution

- The fact that there are project team members who view Robert's power as an example of penalty power is a sign that the team is in need of some team building exercises.
- Team building will help the team get to know each other more and develop trust in each other.
- Then, Robert needs to evaluate his HR Management plan to see if he has a RACI chart for his project to help define who is responsible for what activities. This will aid in minimizing confusion within the project team.

Organizational Theories

A project manager needs to know what motivates the team members to design a reward and recognition plan.

The three popular motivation theories are as follows:

McGregor's Theory of X and Y

McGregor's theory indicates that there are two categories of managers, and this classification is based on what the managers think of their team members.

- **Theory X:** Managers who fall under this category believe that their team members need continuous monitoring. Further, they believe that though the team members are capable, they avoid work whenever possible.

- **Theory Y:** Managers under this category believe that their team members can work without supervision as they look forward to achieve something.

Organizational Theories (Contd.)

A project manager needs to know what motivates the team members to design a reward and recognition plan.

The three popular motivation theories are as follows:

Maslow's Hierarchy of Needs

According to Maslow's Hierarchy of Needs, people's needs change as they grow in their career. Maslow's hierarchy of needs are as follows:

- Physiological: breathing, food, water, sex, sleep, etc.

- Safety: safety of body, employment, resources, morality, family, health, property, etc.

- Social: friendship, family, intimacy, etc.

- Esteem: self-esteem, confidence, achievement, respect, etc.

- Self-actualization: morality, creativity, spontaneity, problem solving, lack of prejudice, acceptance of facts, etc.
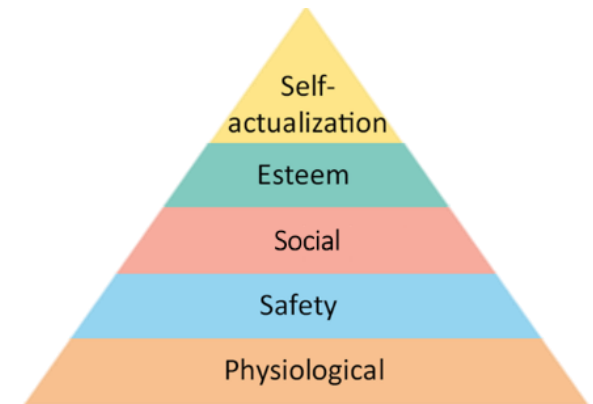
Organizational Theories (Contd.)

A project manager needs to know what motivates the team members to design a reward and recognition plan.

The three popular motivation theories are as follows:

Herzberg's Theory

Herzberg's theory classifies factors as follows:

- Hygiene factors: Mandatory factors to motivate the team
    - Example: personal safety, fair compensation, working conditions, etc.
- Motivating agents: Additional factors that motivate people
    - Example: recognition, higher responsibility, etc.

Key Takeaways

▷ Project resource management includes the processes that organize, manage, and lead the project team.

▷ A functional manager is in charge of a business function and owns the resources; a project manager is responsible for an organization's projects.

▷ Plan Resource Management, Estimate Activity Resources, Acquire Resources, Develop Team, Manage Team, and Control Resource are the six Project Resource Management processes.

▷ Forming, storming, norming, performing, and adjourning are the five stages of team formation.

▷ Reward and expert are usually the best forms of authority that a project manager can use. Penalty should be resorted to as a last option.

▷ Organization theories help a project manager to identify what motivates the team members and accordingly design a reward plan.

▷ A project manager should adopt a leadership style based on the team.

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Additional Reading

(Refer to the exercises provided in the PMP Classroom Exercises)

- Exercise 16

- Exercise 17

Quiz

1. **Which conflict resolution technique is best for a long lasting solution?**

A ▶ Smoothing

B ▶ Forcing

C ▶ Problem solving

D ▶ Withdrawal

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Quiz

1. Which conflict resolution technique is best for a long lasting solution?

A ▶ Smoothing

B ▶ Forcing

C ▶ Problem solving

D ▶ Withdrawal

The correct answer is: **C**

Problem solving is the best way to resolve conflict because it has the greatest probability to reach a permanent solution. All other methods may, at the best, lead to a temporary solution.

Quiz

2. As a project manager, you are deciding the inputs that you need to use on your project. Which process uses an issue log as one of the inputs?

A ▸ Plan Resource Management

B ▸ Manage Team

C ▸ Develop Team

D ▸ Acquire Resources

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Quiz

2. As a project manager, you are deciding the inputs that you need to use on your project. Which process uses an issue log as one of the inputs?

A ▶ Plan Resource Management

B ▶ Manage Team

C ▶ Develop Team

D ▶ Acquire Resources

The correct answer is: **B**

The Manage Project Team process uses an issue log to manage and close all issues related to team members.

Quiz

3. **Which type of power would a project manager have if others believe he or she is highly knowledgeable in the technical area?**

A ▶ Reward

B ▶ Coercive

C ▶ Referent

D ▶ Expert

Quiz

3. Which type of power would a project manager have if others believe he or she is highly knowledgeable in the technical area?

A ▶ Reward

B ▶ Coercive

C ▶ Referent

D ▶ Expert

The correct answer is: D

Expert is the power that comes with expert knowledge in a specific knowledge area.

Quiz

4. You have been assigned as the project manager of an existing project involving 50 company employees and 10 sub-contractors. You want to know who is assigned to do what. Where should you look for this information?

A ▶ Responsibility assignment matrix

B ▶ Project organization chart

C ▶ Pareto chart

D ▶ Resource histogram

Quiz

4. You have been assigned as the project manager of an existing project involving 50 company employees and 10 sub-contractors. You want to know who is assigned to do what. Where should you look for this information?

A ▶ Responsibility assignment matrix

B ▶ Project organization chart

C ▶ Pareto chart

D ▶ Resource histogram

The correct answer is: **A**

Responsibility assignment matrix lists the resources against the work assigned to them.

Quiz

5. **While assessing the performance of your team members, you find that some of them are not strong enough to handle the tasks assigned. What will you do in this situation?**

A ▶ Communicate the improvement needs and establish a performance review and monitoring schedule.

B ▶ Assign double the work and tell them to report the progress at the beginning and end of the day.

C ▶ Return the team members to the functional department and warn the functional head.

D ▶ Wait for them to fail so that you can prove your point and in the meantime start hiring additional resources.

Quiz

5. While assessing the performance of your team members, you find that some of them are not strong enough to handle the tasks assigned. What will you do in this situation?

A ▶ Communicate the improvement needs and establish a performance review and monitoring schedule.

B ▶ Assign double the work and tell them to report the progress at the beginning and end of the day.

C ▶ Return the team members to the functional department and warn the functional head.

D ▶ Wait for them to fail so that you can prove your point and in the meantime start hiring additional resources.

The correct answer is: **A**

It is the most appropriate answer in terms of the performance management life cycle. You need to first communicate the needs (plan), and then ensure that these are being met (review and monitoring).

6. Your software project is in the critical system testing stage when two of the senior members of the team come to you with a conflict on usage of the simulation software during testing. One senior member claims that the other person keeps the software engaged nearly all of the working hours of the project preventing the former from completing test cases. While both need to use the software, you are able to get them to agree to adjust their working schedules so that they no longer overlap. You are using which of the following techniques for conflict resolution?

A ▶ Forcing

B ▶ Smoothing

C ▶ Compromising

D ▶ Collaborating

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Quiz

6. Your software project is in the critical system testing stage when two of the senior members of the team come to you with a conflict on usage of the simulation software during testing. One senior member claims that the other person keeps the software engaged nearly all of the working hours of the project preventing the former from completing test cases. While both need to use the software, you are able to get them to agree to adjust their working schedules so that they no longer overlap. You are using which of the following techniques for conflict resolution?

A ▶ Forcing

B ▶ Smoothing

C ▶ Compromising

D ▶ Collaborating

The correct answer is: **C**

Both team members have to adjust their working schedules to accommodate the limited availability of the simulation software. This would be a compromise for both of them.

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Quiz

7. **You are managing a project in Canada during winter. It gets dark by 5PM, and you find most of the staff leaving early to get to their cars. You are concerned that this will impact productivity. When you inquire, they tell you that the car park is not monitored, and they don't feel safe going to their cars after dark. What Maslow hierarchy are they representing?**

A ▶ Physiological

B ▶ Safety

C ▶ Social

D ▶ Esteem

Quiz

7. **You are managing a project in Canada during winter. It gets dark by 5PM, and you find most of the staff leaving early to get to their cars. You are concerned that this will impact productivity. When you inquire, they tell you that the car park is not monitored, and they don't feel safe going to their cars after dark. What Maslow hierarchy are they representing?**

A ▶ Physiological

B ▶ Safety

C ▶ Social

D ▶ Esteem

The correct answer is: **B**

The team members are concerned for their safety, which is one of the fundamental needs of the Maslow hierarchy. As the project manager, you should consider having security provide escorts for team members to their cars after dark.

Quiz

8. What would NOT be considered a hygiene factor according to Herzberg?

A ▶ Personal safety

B ▶ Fair compensation

C ▶ Working conditions

D ▶ Recognition

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Quiz

8. **What would NOT be considered a hygiene factor according to Herzberg?**

A ▶ Personal safety

B ▶ Fair compensation

C ▶ Working conditions

D ▶ Recognition

The correct answer is: **D**

Recognition would be considered a motivating factor according to Herzberg.

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This concludes

"Project Resource Management."

The next lesson is

"Project Communications Management."

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