Project Resource Management includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project. These processes help ensure that the right resources will be available to the project manager and project team at the right time and place.

In the latest edition of the PMBOK 6th, this knowledge area has expanded to include all resource categories and not just people. Every project requires resources: people, equipment, and materials. One of the highest risks in any project is lack or unavailable critical resources, so developing and implementing a resource management strategy is essential to mitigate the risk.

Some of these processes apply to all types of resources (Plan Resource Management, Estimate Activity Resources, Acquire Resources, and Control Resources). Only two processes (develop and manage the team) focus exclusively on people. Your team is one subset of stakeholders. You may recall we have another people-oriented knowledge area: Stakeholder Management. The key difference between Resource Management and Stakeholder Management is that Resource Management focuses on the project team exclusively, whereas Stakeholder Management looks at anyone who can influence the project or be impacted by the project.
Resource Key Concepts

- The project team consists of individuals with assigned roles and responsibilities who work collectively to achieve a shared project goal.
- The project manager should invest suitable effort in acquiring, managing, motivating and empowering the project team.
- Although specific roles and responsibilities for the project team are assigned, the involvement of all team members in project planning and decision making is beneficial.
- Participation of team members during planning adds their expertise to the process and strengthens their commitment to the project.
- As both the leader and the manager of the project team, the project manager is responsible for the team formation as an effective group.
- As a leader, the project manager is also responsible for proactively developing team skills and competencies, while retaining and improving team satisfaction and motivation.
- Physical resource management is concentrated on allocating and using the physical resources needed for successful completion of the project in an efficient and effective way.
- The project manager should be both leader and manager of the project team. In addition to project management activities such as initiating, planning, executing, monitoring and controlling, and closing the various project phases, the project manager is responsible for the team formation as an effective group.
- The project manager should be aware of different aspects that influence the team, such as: Team environment, Geographical locations of team members, Communications among stakeholders, Organizational change management, Internal and external politics, Cultural issues and organizational uniqueness, and Other factors that may alter project performance.

Failing to manage and control resources efficiently is a source of risk for successful project completion.

For example: 1) Failing to secure critical equipment or infrastructure on time may result in delays in the manufacturing of the final product, 2) Ordering low-quality material may damage the quality of the product causing a high rate of recalls or rework, and 3) Keeping too much inventory may result in high operations costs and reduce the organization’s profit. Unacceptably low inventory level, on the other hand, may result in not satisfying customer demand and, again, reduce the organization’s profit.

Tailoring considerations.

Considerations for tailoring for Project Resource Management includes:

- Diversity
- Physical location
- Industry-specific resources
- Acquisition of team members
- Management of team
- Life cycle approaches

Project management is becoming more and more about empowering the project team members to make decisions rather than the project manager making all the project decisions. This collaborative approach fosters trust, shared ownership, and reliance on experts on the project team. You will need to know which approach your organization prefers, and for your PMP exam.
Resource management methods. Due to the scarce nature of critical resources, in some industries, several trends have become popular in the past several years. There is extensive literature about:

✓ Just-in-time (JIT) manufacturing. Resources are in place only as they are needed. This approach reduces waste, keeps inventory at a minimum, and helps the project manager forecast resource utilization more accurately.

Example of the question:
You are the project manager for the JHG Project. This project requires coordination with the director of manufacturing, HR, the IT department, and the CIO. The director of manufacturing wants to ensure that materials are delivered to the job site only as they are needed because of space limitations. What approach to resource management is this?
A. Just-in-time manufacturing
B. Kaizen
C. Total productive maintenance
D. Human resource coordination

Answer: Correct answer is A. With just-in-time manufacturing, resources are in place only as they are needed. This approach reduces waste, keeps inventory at a minimum, and helps the project manager forecast resource utilization more accurately. B is not the best answer because Kaizen utilizes changes to the organization and project team over time resulting in large changes overall. C is incorrect, because continuous maintenance on equipment and quality systems keeps equipment working well and efficiently. This approach aims to reduce downtime by avoiding equipment failure. D is also incorrect, as human resource coordination is not a valid project management term.

✓ Kaizen. Small changes to the organization and project team over time result in large changes overall. Kaizen posits that small changes in processes are easier to accept and incorporate than large, sweeping changes for the organization or project.

✓ Total productive maintenance. Continuous maintenance on equipment and quality systems keeps equipment working well and efficiently. This approach aims to reduce downtime by avoiding equipment failure.

✓ Theory of constraints. A management system is limited by its weakest components—the constraints—and works to remove those constraints. It is an adaption of the phrase “a chain is only as strong as its weakest link.”

Emotional intelligence (EI). The project manager should invest in personal EI by improving inbound (e.g., self-management and self-awareness) and outbound (e.g., relationship management) competencies. Research suggests that project teams that succeed in developing team EI or become an emotionally competent group are more effective. Additionally, there is a reduction in staff turnover.

Self-organizing teams. The increase in using agile approaches mainly for the execution of IT projects has given rise to the self-organizing team, where the team functions with an absence of centralized control. In
projects that have self-organizing teams, the project manager (who may not be called a project manager) role provides the team with the environment and support needed and trusts the team to get the job done. Successful self-organizing teams usually consist of generalized specialists, instead of subject matter experts, who continuously adapt to the changing environment and embrace constructive feedback.

**Virtual teams/distributed teams.** The globalization of projects has promoted the need for virtual teams that work on the same project, but are not collocated at the same site. The availability of communication technology such as email, audio conferencing, social media, web-based meetings, and video conferencing has made virtual teams feasible. Managing virtual teams has unique advantages, such as being able to use special expertise on a project team even when the expert is not in the same geographic area, incorporating employees who work from home offices, and including people with mobility limitations or disabilities. The challenges of managing virtual teams are mainly in the communication domain, including a possible feeling of isolation, gaps in sharing knowledge and experience between team members, and difficulties in tracking progress and productivity, possible time zone difference and cultural differences.

**Example of the question:**

As a project manager, you want to establish a culture of continuous improvement with your project team, so you encourage the team to look for and implement small incremental improvements in the development process.

Which of the following are you recommending to the team?

A. Kaikaku
B. Decomposition
C. Ishikawa
D. Kaizen

**Answer:**

**Correct Answer:** D

**Explanation:**
Kaizen is the Japanese word for improvement. A kaizen approach makes incremental change through small steps, thereby establishing a process of continuous improvement. By applying kaizen, development teams can optimize efficiency and quality. While the topic of this question is only briefly mentioned in the PMBOK Guide, the Project Management Professional (PMP) Examination Content Outline, June 2015, covers knowledge and skills with which PMP aspirants are expected to be familiar. Continuous improvement processes are among these knowledge and skills. Of the available choices, only the kaizen approach would establish a continuous improvement process by encouraging the development team to look for and implement small incremental improvements in the development process.

**Details for Each Option:**

A. Kaikaku
   Incorrect. Kaikaku is a Japanese word, which means radical change. While kaizen is focused on incremental improvements, kaikaku is focused on radical improvements.

B. Decomposition
   Incorrect. Decomposition is a technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts. Decomposition is a technique that can be used to create the work breakdown structure (WBS) but is not related to continuous improvement.

C. Ishikawa
   Incorrect. Cause-and-effect diagrams are also known as Ishikawa diagrams. This type of diagram breaks down the causes of the problem statement identified into discrete branches. This technique is helpful in identifying the main or root cause of an identified problem but is not used for continuous improvement.

D. Kaizen
   Correct. Kaizen is the Japanese word for improvement. A kaizen approach makes incremental change through small steps.

**Reference:**

**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 innovative problem solving. Collaborative teams may facilitate accelerated integration of distinct work activities, improve communication, increase knowledge sharing, and provide flexibility of work assignments in addition to other advantages.
Although the benefits of collaboration also apply to other project environments, collaborative teams are often critical to the success of projects with a high degree of variability and rapid changes, because there is less time for centralized tasking and decision-making.

Planning for physical and human resources is much less predictable in projects with high variability. In these environments, agreements for fast supply and lean methods are critical to controlling costs and achieving the schedule.

### 9.1 PLAN RESOURCE MANAGEMENT

Plan Resource Management is the process of defining how to estimate, acquire, manage, and use team and physical resources. **The key benefit of this process is that it establishes the approach and level of management effort needed for managing project resources based on the type and complexity of the project.**

This process is performed once or at predefined points in the project.

**Inputs of this process are:** Project charter; Project management plan: (Quality management plan, Scope baseline); Project documents: (Project schedule, Requirements documentation, Risk register, Stakeholder register); Enterprise environmental factors; Organizational process assets

Planning for project resources is vital to a successful project. After all, you’ve got to plan how the project work will be completed and which resources will complete that work. When it comes to planning resources, the project manager is aiming to plan for several facets of the project. Specifically, this planning process answers the following questions:

- What project roles and physical resources are needed on the project?
- What is the responsibility of each role on the project?
- To whom does each role report?
- Will resources on the project come from inside or outside of the organization?
- How will project team members and physical resources be acquired?
- How will project team members and physical resources be released from the project?
- What training needs to be completed for the project team?
- What are the rewards and recognition systems the project may utilize?
- What are the compliance and safety issues that must be addressed?
- How will the usage of the resources affect the operations of the organization?

You can answer some of these questions when you’re doing other project management planning exercises, such as time and cost estimating. All of the answers to these questions are documented in the resource management plan. The resource management plan is the primary output of the resources planning process.

Here are three common constraints (EEF) that may affect your resources planning:

1. **Organizational structure** the structure of the organization has a direct correlation to the amount of power a project manager has. See picture below. It provides a refresher on the organizational structures. For a more in-depth refresher:

   ![Organizational Structure Type Diagram](image)

   *The organizational structure affects the project manager’s power*

**Example of the question:**
You are the project manager in an organization with a weak matrix. Your project team will come from three different lines of business within the organization and they are also working on at least two other projects. Who will have the authority in your project?

A. The project manager
B. The customer
C. Functional management
D. The team leader

Answer: Right answer is C. In a weak matrix structure, functional management will have more authority than the project manager. A, B, and D are all incorrect because these choices do not have as much authority on a project in a weak matrix environment as functional management will have.

2. Collective bargaining agreements Contracts and agreements with unions or other employee groups may serve as constraints for the project.

3. Marketplace conditions your organization may experience a hiring freeze, reductions in the training budget, or a reduction of most travel expenses. The marketplace conditions can also affect the price and availability of the physical resources your project needs.

EXAM TIP Contracts and grievances with unions are constraints. The unions themselves, however, are stakeholders.

Example of the question:
You are the project manager for the LMG Project. Your project will have several human resource issues that must be coordinated and approved by the union. Which of the following statements is correct about this scenario?

A. The union is considered a resource constraint.
B. The union is considered a management constraint.
C. The union is considered a project stakeholder.
D. The union is considered a project team member

Answer: Right answer is C. In this instance, the union is considered a project stakeholder because it has a vested interest in the project’s outcome. A is incorrect because the union is not a resource constraint; it is interested in the project management methodology and the project human resource management. B is incorrect because the union is the counterweight to the management of the organization, not to the project itself. D is also incorrect because the union is not a project team member.

Organizational Process Assets (OPA)
Many projects within any organization are similar to past projects. For example, an architecture firm designs buildings, an IT consultancy may design software or networks, and a manufacturer manufactures products. Within each of these disciplines, and countless others, some projects are similar to projects that have gone before. The past project records, lessons learned, and even past resource management plans can be adapted for the current project. Organizational process assets provide for resource planning that you should know for your PMI exam:

✓ **Organization standards:** you need to understand the human resources policies, procedures, expectations, role descriptions, and rules and policies for physical resources that you, the project manager, will need to adhere to.

✓ **Safety and security policies:** Projects often need to address any safety issues involved in the work that the project team is doing. Safety policies should be reviewed with the project team, and safety measures must be followed; the goal is to keep people safe always. Security policies address how the physical resources are secured and utilized in the project.

✓ **Templates:** Using past project records, including older staffing management plans, as a basis or template for the current project is a great way to save time and maintain consistency among projects. Historical information can serve as a type of template.
Escalation procedures: Are you in charge of the project team when it comes to issue resolution? Or do you have to escalate the issue along to management when problems occur? You need to know the process for escalation and your level of authority over the project team.

Checklists. When it comes to planning for human resources, checklists, which are part of organizational process assets, attempt to identify common elements within similar projects. A checklist can help the project management team identify the following:

- Roles and responsibilities
- Competencies for the project work
- Training programs
- Team ground rules
- Safety issues
- Compliancy
- Rewards and recognition considerations

Tools and techniques for this process are: Expert judgment; Data representation: (Hierarchical charts, Responsibility assignment matrix, Text-oriented formats); Organizational theory; Meetings

Hierarchical Charts show the relationships among superior and subordinate employees, groups, disciplines, and even departments. You've already seen one hierarchical chart: the WBS. When it comes to human resource planning, consider the following five types of charts:

Organization chart. This traditional chart shows how the organization is structured by departments and disciplines. It is sometimes called the organizational breakdown structure (OBS) and is arranged by departments, units, or teams. With regard to project management, an OBS can be used to show which project responsibilities are linked with which departments.

Resource breakdown structure (RBS). This hierarchical chart can decompose the project by the types of resources it contains. For example, your project may be using mechanical engineers, specialized equipment, and materials in several different deliverables throughout the project. The RBS would organize all of the usage of the mechanical engineers, as well as the physical resources, by their disciplines and types rather than by where they are being utilized. An RBS is an excellent tool for tracking resource utilization and costs.

Responsibility assignment matrix (RAM). A RAM chart shows the correlation between project team members and the work they have been assigned to complete. A RAM chart does not necessarily have to be specific to individual team members; it can also be decomposed to project groups or units. Most often, however, RAM charts depict activities and individual workers.

RACI chart. A RACI chart is another matrix chart that involves the activities of responsible, accountable, consult, and inform (hence, the acronym RACI). Technically, a RACI chart is a form of the responsibility assignment matrix, but I want to include it here as a separate entry. This chart, has gained some popularity in recent years, and you will see it on your PMI examination. Notice how the different roles have only one of four responsibilities—responsible, accountable, consult, or inform—for each assignment, but only one person is accountable per activity.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Project Sponsor</th>
<th>Project Manager</th>
<th>Business Analyst</th>
<th>Technical Architect</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>A</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirements</td>
<td>I</td>
<td>A</td>
<td>R</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Functional Spec</td>
<td>A</td>
<td>C</td>
<td>R</td>
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<tr>
<td>TDD</td>
<td>A</td>
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<td>R</td>
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<td>Code</td>
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<td>C</td>
<td>R</td>
</tr>
</tbody>
</table>

RACI charts show the relationships among activities and project team members.
Example of the question:
A scheduling error occurred on a construction project that you are managing. The painting contractors arrived as scheduled, but the drywall was not yet finished. As the project manager, you want to know who was responsible for scheduling the contractors and who should be held accountable.

What tool or technique is most helpful in this situation?

A. Project organization charts
B. Resource management plan
C. Hierarchical charts
D. Responsibility assignment matrix

Answer:
Correct Answer: D
Explanation:
A RACI chart is a common type of responsibility assignment matrix (RAM) that uses responsible, accountable, consult, and inform statuses to define the involvement of stakeholders in project activities. A RACI chart is developed during the Plan Resource Management process, and it is the best tool to identify the responsible party for a project activity as well who is accountable.

The resource management plan may contain project roles and responsibilities as well as the RAM. However, the question specifically asks for a tool or technique, and the resource management plan is a component of the project management plan and not a tool or technique. Therefore, the resource management plan can be eliminated as a correct response, making the assignment matrix the best answer to the question asked. It is important to read the question carefully especially when there are two potentially correct answers.

Details for Each Option:
A. Project organization charts
   Incorrect. A project organization chart is a graphic display of project team members and their reporting relationships. However, the project organization chart will not likely contain information about assigned responsibilities for project activities.
B. Resource management plan
   Incorrect. The resource management plan may contain project roles and responsibilities, but the resource management plan is not a tool or technique as stated in the question.
C. Hierarchical charts
   Incorrect. Hierarchical charts can be used to show positions and relationships in a graphical, top-down format. The hierarchical charts are not typically a source of information regarding roles and responsibilities for project activities.
D. Responsibility assignment matrix
   Correct. A RACI chart is a common type of responsibility assignment matrix (RAM) that uses responsible, accountable, consult, and inform statuses to define the involvement of stakeholders in project activities. A RACI chart is the best tool to identify the responsible party for a project activity as well who is accountable.

Reference:

Example of the question:
You are the project manager of the PLN Project. You are using a RACI chart to organize roles and responsibilities for project assignments. In a RACI chart, what is the maximum number of people that can be accountable for an assignment?

A. One
B. Two
C. Two, if one of the two people is also responsible
D. As many people that are on the project team

Answer: Right answer is A. In a RACI chart, which stands for Responsible, Accountable, Consulted, and Informed, only one person is accountable. Choices B, C, and D are incorrect because these choices enable more than one person to be accountable.

Text-oriented format. A text-oriented chart is really more of a shopping list of what a team member is responsible for within the project. It defines project responsibilities, reporting relationships, project authority, competencies, and qualifications. You might also know these as position descriptions or role-responsibility-authority forms.

Outputs of this process are: Resource management plan; Team charter; Project documents updates: (Assumption log, Risk register)
The Plan Resource Management process creates the resource management plan and the team charter. The resource management plan documents how you will estimate, acquire, manage and control project resources including the physical resources (equipment and materials) and people resources (your team). The team charter documents expectations and guidelines regarding how the team will work together.

The resource management plan may include but is not limited to:

**Identification of resources** Methods for identifying and quantifying team and physical resources needed.

**Acquiring resources** Guidance on how to acquire team and physical resources for the project.

**Roles and Responsibilities**: Resource planning accomplishes wonderful things. It communicates information about the resources the project will need, the project team’s roles and responsibilities, the structure of the project team, and more. One of the fundamental things that human resource planning does for the project is to identify the attributes of the project team. You will need to know these four attributes for your PMI examination:

**Role.** This denotes what a person is specifically responsible for in a project. Roles are usually tied to job titles, such as network engineer, mechanical engineer, and electrician. It is what a person does.

**Authority.** Project team members may have authority over other project team members, may have the ability to make decisions, and may even sign approvals for project work and purchases. Authority levels define which project team members have what levels of authority within the project.

**Responsibility.** A responsibility is the work that a role performs. More precisely, it is the work that a project team member is responsible for within the project.

**Competency.** This attribute defines what talents, skills, and capacities are needed to complete the project work. If there is a skill gap, then training, development, hiring, and even schedule and scope changes can result.

**Project Organization Chart**

Another output of the resource planning process for your project is a project organization chart. This chart, as its name implies, illustrates the organization of the project, the project team members, and all the associated reporting relationships. The level of detail of the project organization chart is relative to the size of the project team and the priority of the project. In other words, a massive international project with 3,000 project team members around the globe will likely have more detail than a 20-person project team to create a new piece of software.

**Example of the question:**

You are leading a large project with multiple teams. You want to have a graphical representation of your project organization in detail. What of the following would best address your needs?

- A. Organizational breakdown structure
- B. Flowchart
- C. Project organization chart
- D. Responsibility assignment matrix

**Answer:**
Project team resource management: Guidance on how project team resources should be defined, staffed, managed, and eventually released.

Training: Training strategies for team members.

Team development: Methods for developing the project team.

Resource control: Methods for ensuring adequate physical resources are available as needed and that the acquisition of physical resources is optimized for project needs. Includes information on managing inventory, equipment, and supplies during throughout the project life cycle.

Recognition plan: Which recognition and rewards will be given to team members, and when they will be given.

Creating a Team Charter

A team charter is a document typically created by the project team to define their values, agreements, and ground rules for the project. In some organizations, the team charter may be developed for the project team, though the charter works best when the project team creates the document—or at least has a part in creating it. The team charter includes the following:

- Team values
- Communication guidelines
- Decision-making process
- Conflict resolution process
- Meeting guidelines
- Team agreements

When ground rules are created and agreed upon, it’s up to all project team members to enforce them. The team charter helps to establish the values and agreement as to how the project team will operate and abide by the ground rules.

Again – Remember:

| Task 5 | Develop the human resource management plan by defining the roles and responsibilities of the project team members in order to create a project organizational structure and provide guidance regarding how resources will be assigned and managed. |
9.2 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. The key benefit of this process is that it identifies the type, quantity, and characteristics of resources required to complete the project. This process is performed periodically throughout the project as needed.

As you can guess, resource estimating goes hand in hand with cost estimating. After all, if you need a metric ton of pea gravel, that’s a resource estimate, but someone’s got to pay for that gravel.

To estimate the demand for the project resources, you’ll need several inputs:

Inputs of this process are: Project management plan: (Resource management plan, Scope baseline); Project documents: (Activity attributes, Activity list, Assumption log, Cost estimates, Resource calendars, Risk register); Enterprise environmental factors; Organizational process assets

Resource calendars: These let you know when individual resources are available. A resource calendar tells you when Bob has scheduled a vacation, when a piece of equipment that your project needs is already scheduled for use, and even when facilities such as meeting rooms are available.

Project calendars: These communicate when the project work may take place. For example, your project may allow work to happen between 6 A.M. and 6 P.M., Monday through Friday. Your project calendar will also identify any holidays when the project work won’t happen.

Tools and techniques for this process are: Expert judgment; Bottom-up estimating; Analogous estimating; Parametric estimating; Data analysis: (Alternatives analysis); Project management information system; Meetings

Expert Judgment: The project manager and the project team have worked together to create the WBS, the activity list, and the sequence of activities, so it makes sense that they will continue to work together to create the resource estimates. And they do. According to the PMBOK, the project management team may work with experts to help make the best decisions. This is using the old standby “expert judgment,” when the project manager relies on someone more knowledgeable to help make the best decision.

Bottom-Up Estimating: Bottom-up estimating is the most accurate time-and-cost estimating approach a project manager can use. This estimating approach starts at “the bottom” of the project and considers every activity, its predecessor and successor activities, and the exact amount of resources needed to complete each activity. Bottom-up estimating accounts for all of the resources needed to complete all of the project work. Although it is the most accurate estimating approach, it is also the most time consuming.

Analogous Estimating

Recall that analogous estimating relies on historical information from similar projects to predict duration and cost in the current project. With estimating activity resources, an analogous estimate will take a past project and examine the type of resources utilized, the amount of resources, the cost of resources, and even the duration of the activities for which the resources were utilized. This is a quick estimating approach, and its accuracy is dependent on the accuracy of the historical information the estimate is based upon. Analogous estimating is sometimes called a top-down estimate.

Parametric Estimating

Parametric estimating uses a parameter, such as cost per square foot or eight hours of labor per fixture, to predict resource utilization and cost. The parameter must be well established and agreed upon, such as the eight hours of labor per fixture. If the parameter isn’t well established, the estimate is likely going to be flawed. For example, if your project team has 2,500 fixtures to install, and your team estimates that it’ll take those four hours per fixture to install them, but they’ve never installed even one of these fixtures before, that’s a risky estimate. The better the data the estimate is based upon, the more reliable the estimate will be.

Alternative Analysis
As the project management team determines what resources are needed, there will be plenty of opportunities to determine which solution is the best solution for the project. Whenever more than one solution is presented, this is called alternative analysis. Alternative analysis is a type of data analysis and comes in many different flavors. Here are some examples:

**Resources:** Employees or consultants, junior or senior engineers;

**Tools and equipment:** Power tools or handheld tools, newer versus older machinery;

**Types of materials:** Oak versus plywood;

**Make-or-buy decisions:** Build-your-own software or buy a solution from a vendor.

**Data Analysis Techniques** (e.g., document analysis).

**Project Management Information System (PMIS)** – This can include resource management software that can help plan, organize and manage the resource pool and develop resource estimates.

**Meetings** – The project manager may hold planning meetings with functional managers to estimate the resources needed for the project.

**Outputs of this process are:** Resource requirements; Basis of estimates; Resource breakdown structure; Project documents updates: (Activity attributes, Assumption log, Lessons learned register)

So what do you get when the project manager, the project team, and all your experts complete the estimate activity resource process? You get the requirements for all the project resources. Not a trick question! The process enables the project manager, the project team, management, and your key stakeholders to see the resources needed to complete each work package in the WBS. Specifically, at the end of this process you will have the following:

- **Resource requirements for each activity:** You will know what resources are needed, the assumption your project management team used to create the requirements, and the basis for each estimate.
- **Basis of estimates:** Your supporting details for creating the resource estimates should be documented. You’ll document how the estimate was created, what resources you used to create the estimate, assumptions, constraints, and a range of estimates. You should also include how confident you are in the estimate and document the risks associated with the estimate.
- **Resource breakdown structure:** On some projects, especially larger projects, you may create an RBS. The RBS visualizes the resources needed throughout the project. It can follow the same structure as the WBS, or you can arrange the breakdown by types of resources, such as roles, equipment, facilities, and materials. The RBS can help you define what resources you need to acquire or procure, and what roles are needed in the project work.
- **Activity attributes updates:** The activities will be updated to reflect the resource requirements you’ve identified with this process.
- **Assumptions log:** Any assumptions about the resource type, quantity, constraints, and other related information is recorded.
- **Lessons learned register:** If any lessons were learned during the process, such as the effectiveness of how the estimates were created, they should be documented.

### 9.3 Acquire Resources

Acquire Resources is the process of obtaining team members, facilities, equipment, materials, supplies, and other resources necessary to complete project work. The key benefit of this process is that it outlines and guides the selection of resources and assigns them to their respective activities. This process is performed periodically throughout the project as needed.

**Inputs of this process are:** Project management plan: (Resource management plan, Procurement management plan, Cost baseline); Project documents: (Project schedule, Resource calendars, Resource requirements, Stakeholder register); Enterprise environmental factors; Organizational process assets

After you estimate the resources you need, it's time to acquire them. Let’s talk about your team first. Project managers rarely have formal authority over their team, so you may not have much say in the selection of team members. It will be a negotiation between you and their boss (functional managers).
Sourcing resources will depend on a few considerations. First, skill sets and competencies. Every project creates something new. It is possible that the company hasn’t had the need for the skill sets to-date and they don’t exist internally. Next, quantity. How many resources do you need? Project work and operational work compete for the same resources. It’s possible that organizational capacity is limited and can’t support the project. The third sourcing consideration is availability. The organization has the resources but not the week you need them. Organizations tend to prefer sourcing internally before looking externally for resources, but it may not be in the best interests of the project to do so (increased risk).

Example of the question:

If resources are unavailable internally, then you will need to consider alternatives. These include:

External resources like contractors. The same considerations will apply here. There’s no guarantee you’ll find the skill sets, competencies or availability from external sources either. The marketplace can have a significant impact too. High demand often translates into higher costs.

Virtual team members: Just because resources aren’t available locally, that doesn’t mean they aren’t available at all. Larger companies may have multiple locations with available resources. Having a larger pool of resources to select from increases the chances of getting qualified and available resources. However, virtual teams can be more challenging to manage. Virtual team members aren’t always a viable alternative. Sometimes, the work requires resources to be at a specific location like a construction site.

Acquire Resources – Physical Resources
Your team can’t get the project work done if they don’t have the required equipment and materials. Some physical resources are scarce and in high demand just like certain team members, so it’s equally important to have an acquisition plan for materials, facilities, and equipment.

Additional challenge unique to physical resources are long lead times. Some pieces of equipment can take more than six months to build and deliver. Lead times must be carefully managed.

Materials are estimated for project work. Actual costs can be very different than the initial estimate due to market conditions.

Monitoring market conditions can help you take advantage of better pricing. Additionally, excessive shipping charges occur when materials aren’t ordered when they should have been ordered. It is an unnecessary project expense easily controlled to avoid the negative impacts to the budget.

There are several tools and techniques associated with acquiring resources:

**Tools and techniques for this process are:** Decision-making: (Multicriteria decision analysis); Interpersonal and team skills: (Negotiation); Pre-assignment; Virtual teams

**Negotiating (Interpersonal and team skills)**

Why do we negotiate? If you think about it, there would be no need to negotiate if everybody could get everything they wanted. But that’s not reality. We negotiate to get what the project needs with others with competing needs. We will negotiate agreements for people, equipment, and use of facilities. We’ll negotiate terms such as pricing, availability, and schedule. Negotiating skills are essential for every project manager.

**Decision Making (Multicriteria decision Analysis)**

Decision making processes are used to help people choose between multiple options or alternatives. Do you want resource A or resource B on the team? Should we use an automated process or a manual one? Decision making is based on established criteria, so the best decision can be made based on the information available. Good decisions improve the probability of project success.

**PRE-ASSIGNMENT**

When physical or team resources for a project are determined in advance, they are considered pre-assigned. This situation can occur if the project is the result of specific resources being identified as part of a competitive proposal or if the project is dependent upon the expertise of particular persons. Pre-assignment might also include the team members who have already been assigned in Develop Project Charter Process or other processes before the initial Resource Management Plan has been completed.

**Virtual Teams**

Placing all of the project team members in one geographical location is ideal for many project managers. In theory, having all of the project team members together enable the team members to communicate quickly, work with each other, and generally work better as a team. In reality, colocation is not always possible: Team members may be spread around the globe, space may not be necessarily available in one locale, and other logistics can prevent bringing all of the project team together in a project war room. (And, yes, there’s no fighting in the war room.)

Virtual teams are likely in today’s world. Collaboration software, Internet tools, phone calls, and e-mails can help increase communications and the sense of a **collocated** team without the expense and improbability of a **collocated** team. Virtual teams enable the organization to do the following:

- Create a project team that comprises experts from around the globe;
- Permit people to work from home offices;
- Permit people to work different shifts and hours;
- Include people on the project team who may have mobility limitations

**EXAM TIP** The negative side to virtual teams is that communication can be more difficult, and costs can be incurred from coordinating and managing the needed communication among the virtual team members. **Collocated** teams are in the same physical area. **Virtual** teams are sometimes called **non-collocated**.
**Outputs of this process are:** Physical resource assignments; Project team assignments; Resource calendars; Change requests; Project management plan updates: (Resource management plan, Cost baseline); Project documents updates: (Lessons learned register, Project schedule, Resource breakdown structure, Resource requirements, Risk register, Stakeholder register); Enterprise environmental factors updates; Organizational process assets updates

Once resources are acquired, you’ll want to confirm them. This is done by assigning them. People can be committed to the schedule and physical resources like pieces of equipment or facilities can be reserved for the project. Scarce resources may be pre-assigned as a condition of project approval. Executive support and approval will make it more likely those resources will be available when needed. If not, the project will be in serious trouble.

Another output of this process is resource calendars. Resource calendars are unique to a specific resource. That resource may be a person, a group, or a non-human resource like a facility or equipment. Resource calendars contain resource-specific availabilities such as vacations or training days. Some resources may not be available for the entire project duration. Resource calendars will document when the resource is available to the project (if they aren’t available on day one of the project) and when the resource must leave the project (if earlier than the last day of the project). Some departments have different working days and working hours. These are also noted on resource calendars.

**9.4 DEVELOP TEAM**

Develop Team is the process of improving competencies, team member interaction, and the overall team environment to enhance project performance. *The key benefit of this process is that it results in improved teamwork, enhanced interpersonal skills and competencies, motivated employees, reduced attrition, and improved overall project performance.* This process is performed throughout the project.

**Exam Tip** On the exam, you may be asked questions regarding these two processes. How are they alike and how are they different?

*The Develop Team* process is used to improve team performance by establishing a favorable environment, improving competencies and team building.

*The Manage Team* process tracks individual performance, providing feedback and resolving issues as they arise. The goal is to optimize team performance even as the team composition changes.

Both are processes within the Executing process group. But they are executing different things. The Develop Team process is working to create the environment and mature the team. The Manage Team process focuses on keeping things on the right path and addressing issues so they don’t have a negative impact on the team’s productivity or performance.

One of the models used to describe team development is the Tuckman ladder, which includes five stages of development that teams may go through. Although it is common for these stages to occur in order, it is not uncommon for a team to get stuck in a particular stage or regress to an earlier stage. Projects with team members who worked together in the past might skip a stage.

**Forming.** This phase is where the team members meet and learn about the project and their formal roles and responsibilities. Team members tend to be independent and not as open in this phase.

**Storming.** During this phase, the team begins to address the project work, technical decisions, and the project management approach. If team members are not collaborative or open to differing ideas and perspectives, the environment can become counterproductive.

**Norming.** In this phase, team members begin to work together and adjust their work habits and behaviors to support the team. The team members learn to trust each other.

**Performing.** Teams that reach the performing stage function as a well-organized unit. They are interdependent and work through issues smoothly and effectively.
**Adjourning.** In this phase, the team completes the work and moves on from the project. This typically occurs when staff is released from the project as deliverables are completed or as part of the Close Project or Phase process.

The duration of a particular stage depends upon team dynamics, team size, and team leadership. Project managers should have a good understanding of team dynamics in order to move their team members through all stages in an effective manner.

Team development is a natural process, but it’s also a process that the project manager can usher along. If you’re the project manager and you want team members to work together, get along, and focus on completing the project rather than focusing on who’s really in charge of the project, you’ll need these inputs:

**Inputs of this process are:** Project management plan: (Resource management plan); Project documents: (Lessons learned register, Project schedule, Project team assignments, Resource calendars, Team charter); Enterprise environmental factors; Organizational process assets.

The **Resource Management Plan** provides guidance on providing project team member rewards, feedback, additional training, and disciplinary actions as a result of team performance assessments and other forms of project team management. The resource management plan may include also the team performance assessment criteria.

**Project team assignments** identify the team and member roles and responsibilities.

**Resource calendars** identify times when the project team members can participate in team development activities. It also helps illustrate team availability during the entire project.

The **team charter** is where the team operating guidelines are documented. The team values and operating guidelines provide the structure that describes how the team will operate together.

The **Enterprise Environmental Factors** that can influence the Develop Team process include but are not limited to:

- Human resource management policies regarding hiring and termination, employee performance reviews, employee development and training records, and recognition and rewards;
- Team member skills, competencies, and specialized knowledge; and
- Geographic distribution of team members.

The **Organizational Process Assets** that can influence the Develop Team process include but are not limited to historical information and the lessons learned repository.

**Tools and techniques for this process are:** Colocation; Virtual teams; Communication technology; Interpersonal and team skills: (Conflict management, Influencing, Motivation, Negotiation, Team building); Recognition and rewards; Training; Individual and team assessments; Meetings

Good teams do not happen by accident. They are developed, and it’s your job as project manager to take this group of individuals and make them into the best-performing team possible. High performing project team increase your confidence the project will finish on-time and on-budget. The objective is turning a group of people into a team. The tools and techniques to accomplish that goal take two approaches. First, find ways to improve the team’s ability to interact with each other. When logistically practical, have the team **collocate**.
Example of the question:

The sponsor has signed the project charter, and you have been assigned to manage the project. Several employees have already been selected for the project team, and you have not worked with any of them on previous projects.

Which of the following will help build relationships between the team members?

A. Creating an issue log
B. Colocation
C. Team performance assessments
D. Observation and conversation

Correct Answer: B

Explanation:

Building relationships between the team members is important for team development, and a cohesive team will enhance the project's performance. Many of your team members have been pre-assigned enabling you to begin team building early in the project. Placing the team in the same room, hence colocating, allows the team to build relationships with each other and develop a sense of community. While colocation is not always feasible, of the choices provided, it is the best answer to the question asked.

Details for Each Option:

A. Creating an issue log
   Incorrect. Issue logs are used to communicate issues on a project as well as who is responsible for resolving them and in what time frame. Issue logs help project managers effectively track and manage issues rather than assist with team building.

B. Colocation
   Correct. Colocation involves placing team members together in the same room. Having a team colocated can help them develop a sense of community and improve their communication. In turn, assist with team building. While colocation is not always feasible, of the choices provided, it is the best answer to the question asked.

C. Team performance assessments
   Incorrect. Team performance assessments evaluate the team's effectiveness so that actions can be taken to address any issues that may be affecting the team's efficacy. The project manager may determine more team building is required as a result of an assessment of the team, but the team performance assessments are not a team building activity.

D. Observation and conversation
   Incorrect. By observing the work and the project team, the project manager can proactively speak to team members about issues that might be developing. Observation and conversation are tools used to manage the team rather than develop the team.

Reference:


Colocation involves placing many or all of the most active project team members in the same physical location to enhance their ability to perform as a team. Colocation can be temporary, such as at strategically important times during the project, or can continue for the entire project. Colocation strategies can include a team meeting room, common places to post schedules and other conveniences that enhance communication and a sense of community there is no substitute for face-time when building relationships. If you are collocating the team permanently is not an option, then the occasional face-to-face meeting will have to suffice. In the meantime, you’ll have to use available communication technologies to support the team’s ability to work with each other and a repository for project documentation. The second approach utilizes interpersonal skills to guide and support the individuals who make up the project team.

The team must keep focused on the project objectives. Interpersonal skills used here include motivating, influencing, and team building to remind them of the objectives and the importance of working together. In addition, if the team is struggling, then you will need to handle issues and resolve conflicts and negotiate with them as needed. People are motivated when they understand and support the project objective and are recognized for their part in making it happen.

Recognition could be a simple “thank you” or it may take a more tangible form like training to improve skills or rewards. What the team needs will vary based on the team development stage they are in.

Example of the question:
Individual and team assessment tools give the project manager and the project team insight into areas of strengths and weaknesses. These tools help project managers assess team members’ preferences, aspirations, how they process and organize information, how they make decisions, and how they interact with people. Various tools are available such as attitudinal surveys, specific assessments, structured interviews, ability tests, and focus groups. These tools can provide improved understanding, trust, commitment, and communications among team members and facilitate more productive teams throughout the project.

Example of the question:

The various teams working on your project have gone through an extensive array of training and development activities specified in the resource management plan to ensure optimum performance. However, one of the teams has seen substantial turnover since the training was completed. You realize that for this particular team, you will have to identify specific training and coaching to align the competencies of these new team members with the rest of the teams.

What is the best approach for you to take in this situation?

A. Conduct team performance assessments
B. Repeat the training regime for the team
C. Create work performance reports
D. Review the resource management plan
Meetings are used to discuss and address pertinent topics for developing the team. Attendees include the project manager and the project team. Types of meetings include but are not limited to project orientation meetings, teambuilding meetings, and team development meetings.

Example of the question:

A hydroelectric project is running ahead of schedule and under budget, and the customer is pleased with the progress. Following the resource management plan, you have used the appropriate tools and techniques to identify the strengths and weaknesses of the project team.

What should you do next?

A. No action is required since the project is expected to exceed project objectives
B. Select topics and develop the agenda for a team development meeting
C. Submit a change request to modify the resource management plan
D. Utilize individual and team assessment tools and techniques

Answer:

Correct Answer: B

Explanation:

The question implies that you are conducting the Develop Team process and have used individual and team assessment tools to identify the strengths and weaknesses of the project team. The next logical step is to build upon the project team's strengths and address the identified weaknesses. Meetings are one of the tools that may be used during the Develop Team process. Meetings are used to discuss and address pertinent topics for developing the team. Attendees include the project manager and the project team. Types of meetings include project orientation meetings, team building meetings, and team development meetings. The incorrect answer choices represent actions which will not utilize the identified strengths and weaknesses to develop the project team further. Therefore, of the available options, selecting topics and developing the agenda for a team development meeting is the best response.

Details for Each Option:

A. Incorrect. One of the responsibilities of the project manager is to provide for the ongoing development of the project team. Even though the project is going well thus far, there may be upcoming challenges which will require further team development. Additionally, no matter how well the project team is performing, individual and team performance can always be improved.

B. Correct. The team strengths and weaknesses identified, the next logical step is to build upon the project team's strengths and address the identified weaknesses. Meetings, including team development meetings, are one of the tools that may be used during the Develop Team process to discuss and address pertinent topics for developing the team.

C. Incorrect. The resource management plan may or may not be updated as an output of the Develop Team process. In this case, you, as the project manager, are following the resource management plan, and there is no information presented by the question to suggest that a modification of the resource management plan is necessary.

D. Incorrect. Individual and team assessment tools and techniques give the project manager and the project team insight into areas of strengths and weaknesses. The question states that the appropriate tools and techniques have already been used to identify the strengths and weaknesses of the project team. Therefore, this answer choice represents an activity which has already been completed.

Reference:


Outputs of this process are: Team performance assessments; Change requests; Project management plan updates (Resource management plan); Project documents updates: (Lessons learned register, Project schedule,
Project team assignments, Resource calendars, Team charter); Enterprise environmental factors updates, Organizational process assets updates.

**Assessing the Project Team**

You want your project team to be the best unit of people possible. You want them to rely on one another, help each other, and communicate without fear of retribution. You also want the project team to be competent in the project work and execution of the project management plan. Personnel assessment tools, such as exams and surveys, can help you gain some insight into the project team and where each person’s strengths and weaknesses lie. This can help you determine the best ways to manage the project team, improve performance, and gain insight into what motivates team members. The assessments of the project team can measure all sorts of factors, but there are some common measurements as a result of the assessment program:

- Technical success of the project execution;
- Project schedule adherence;
- Cost baseline management;
- Improvement in competencies;
- Reduction in staff turnover;
- Team functionality in communications and problem-solving.

Project team members’ performance is reviewed and tied to their overall performance on the project team. Performance appraisals can be in the form of a 360-degree appraisal, where a project team member is reviewed in all directions by the project team, the project manager, stakeholders, and even vendors, where appropriate.

**9.5 MANAGE TEAM**

Manage Team is the process of tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance. *The key benefit of this process is that it influences team behavior, manages conflict, and resolves issues.* This process is performed throughout the project. Manage Team is a natural extension of the work that's done in the Develop Team process. As you develop the team, you’ll want to let team members know how they're doing. This feedback can result in several actions. Just remember that teams are made of many individuals. Each has their own responsibilities and capabilities. Working well as a team means getting the best out of each individual.

**Inputs of this process are:** Project management plan: (Resource management plan); Project documents: (Issue log, Lessons learned register, Project team assignments, Team charter); Work performance reports; Team performance assessments; Enterprise environmental factors; Organizational process assets.

The resource management plan provides guidance on how project team resources should be managed and eventually released.

Issues arise in the course of managing the project team. An issue log can be used to document and monitor who is responsible for resolving specific issues by a target date.

**Project team assignments** identify the team member roles and responsibilities. The team charter provides guidance for how the team will make decisions, conduct meetings, and resolve conflict.

**Work Performance reports** can help with project team management include results from schedule control, cost control, quality control, and scope validation. The information from performance reports and related forecasts assists in determining future team resource requirements, recognition and rewards, and updates to the resource management plan.

**Team Performance Assessments.** The project management team makes ongoing formal or informal assessments of the project team’s performance. By continually assessing the project team’s performance, actions can be taken to resolve issues, modify communication, address conflict, and improve team interaction.

**The Enterprise Environmental factors** can influence the Manage Team process include but are not limited to human resource management policies.

**The Organizational process assets** that can influence the Manage Team process include but are not limited to certificates of appreciation, corporate apparel, and other organizational perquisites.
Tools and techniques for this process are: Interpersonal and team skills: (Conflict management, Decision making, Emotional intelligence, Influencing, Leadership); Project management information system.

Any time there are two or more people in the same room - there is the potential for conflict. There are many potential sources of conflict in a project. You can expect to see this topic on the exam. This is due to a variety of factors, ranging from misunderstanding of work duties to personality conflicts.

Dealing with Team Disagreements

In most projects, there will be instances when the project team, management, and other stakeholders disagree on the progress, decisions, and proposed solutions within the project. It’s essential for the project manager to keep calm, lead, and direct the parties to a sensible solution that’s best for the project. Here are seven reasons for conflict, listed from most common to least common:

✓ Schedules
✓ Priorities
✓ Resources
✓ Technical beliefs
✓ Administrative policies and procedures
✓ Project costs
✓ Personalities

Here are five considerations for conflict management before acting on the conflict:

1. Importance of the conflict and how disruptive the conflict is;
2. Possibility of the conflict disrupting the project progress immediately;
3. Power of the people in the conflict and how they can influence the project;
4. Need for the project manager to maintain relationships with the people involved;
5. Need for a long-term resolution or a short-term fix for the project’s sake.

Managed conflict brings about positive change, but unmanaged conflict will bog down project progress and team performance. The key conflict resolution message is that there are many techniques and they should be selected based on the situation.

Here are the most common Conflict Resolution Techniques:

- Collaborate/problem-solve: This approach utilizes multiple viewpoints and perspectives to find a resolution. To use this method, the participants need a collaborative attitude to confront the problem rather than each other. This approach can result in a win-win situation.
- Force/direct: The person with the power makes the decision. The decision made may not be the best decision for the project, but it’s fast. As expected, this autocratic approach does little for team development and is a win-lose solution. It should be used when the stakes are high and time is of the essence, or if relationships are not important.
- Compromise/reconcile: This approach requires that both parties give up something. The decision made is a blend of both sides of the argument. Because neither party really wins, it is considered a lose-lose solution. The project manager can use this approach when the relationships are equal and no one can truly “win.” This approach can also be used to avoid a fight.
- Smoothing/accommodating: This approach smooths out the conflict by minimizing the perceived size of the problem. It is a temporary solution that can calm team relations and boisterous discussions. Smoothing may be acceptable when time is of the essence or when any of the proposed solutions will not currently settle the problem. This can be considered a lose-lose situation as well, since no one really wins in the long run. The project manager can use smoothing to emphasize areas of agreement between disagreeing stakeholders and thus minimize areas of conflict.
- Withdrawal/avoidance: This conflict resolution has one side of the argument walking away from the problem, usually in disgust. The conflict is not resolved, and it is considered a yield-lose solution. The approach can be used, however, as a cooling-off period or when the issue is not critical.
Example of the question:
The project manager and a stakeholder get into a heated debate about the stakeholder’s idea requiring a scope change to the project. The project manager says the change will not be implemented and that the stakeholder must drop the idea. The project manager emphasizes that she is the project manager and the decision is final.
Should the project manager have responded differently to resolve the conflict?

A. No, the project manager has the formal authority to make the final decision.
B. Yes, the project manager should have discussed the idea with other stakeholders.
C. No, the project manager was demonstrating the culture in which the company works.
D. Yes, the project manager should have compromised with the stakeholder.

Answer:
Correct Answer: B
Explanation:
The project manager is using the force/direct conflict resolution technique, which involves pushing one’s viewpoint at the expense of others and offering only a win-lose solution. While force/direct is a legitimate conflict resolution technique, it should be used only when other conflict resolution techniques fail or when the situation warrants this approach. The scenario described in the question does not suggest that other conflict resolution techniques have been used or that the situation is so acute that the project manager was left with no option except to use the force/direct technique. Since it appears the project manager did have other options, she should have pursued a win-win outcome, which the collaborative/problem-solving technique often creates. Discussing the stakeholder’s idea with other stakeholders is the only conflict resolution technique offering the possibility of a win-win situation, and therefore is the best answer to the question asked.

Details for Each Option:
A. No, the project manager has the formal authority to make the final decision.
   Incorrect. Unless there is an emergency (which is not the case in the scenario described), the project manager should not push her viewpoint onto others from a stance of power, known as a force/direct conflict resolution technique. This approach usually ends with a win-lose situation and therefore is not the best course of action in this situation. The project manager should have responded differently.
B. Yes, the project manager should have discussed the idea with other stakeholders.
   Correct. The project manager should have used a collaborative/problem-solving approach to address the conflict, such as discussing the idea with other project stakeholders and/or the team. Such a discussion would have allowed both sides to incorporate multiple viewpoints and insights from differing perspectives and hopefully lead to a win-win outcome with consensus and commitment.
C. No, the project manager was demonstrating the culture in which the company works.
   Incorrect. The project manager may well have been demonstrating the culture of the company (raising another issue, which is outside the scope of this question) but using a force/direct technique is still not the best way to resolve a conflict.
D. Yes, the project manager should have compromised with the stakeholder.
   Incorrect. Compromising often leads to a lose-lose outcome because this technique searches for a resolution to the conflict in order to appease both parties, but the decision may not be the best for the project. While compromising could have been a better approach than forcing, a collaborative/problem-solving approach is preferred. Therefore, this answer is not the best choice.

Reference:

Example of the question:
You are the project manager of the Holston Implementation Project for your company. It’s come to your attention that three of your project team members are in a disagreement about the direction the project work should take. This disagreement is stalling the project schedule and causing the other project team members to become uncomfortable. You need to resolve this situation quickly and professionally. Which problem-solving technique is the best for most project management situations?

A. Collaborating/problem-solving
B. Compromising
C. Forcing
D. Avoiding

Answer: Right answer is A. Collaborating/problem-solving is the best problem-solving technique because it meets the problem directly. B is incorrect because compromising requires both sides of an argument to give up something. C is incorrect because forcing requires the project manager to force a decision based on external inputs, such as seniority, experience, and so on. D is also incorrect because avoiding ignores the problem and does not solve it.
**Decision making**

Decision making, in this context, involves the ability to negotiate and influence the organization and the project management team, rather than the set of tools described in the decision making tool set. Some guidelines for decision making include:

- Focus on goals to be served,
- Follow a decision-making process,
- Study the environmental factors,
- Analyze available information,
- Stimulate team creativity,
- Account for risk.

**Example of the question:**

Two project team members are having a disagreement over how to approach a minor technical detail. The project manager has little experience working with them and limited technical knowledge. What is the best action for the project manager to take?

A. Aside by the decision of the most senior team member
B. Avoid being involved in the discussion and decision making
C. Stop the discussion and direct the team members to get back to work
D. Request the human resource department’s representative to step in

**Answer:**

**Correct Answer:** B

**Explanation:**

As the project team is working on the project, there are going to be situations where an answer must be worked out. Sometimes these situations are complex, requiring a lot of debate and discussion; other times these are very simple decisions. These minor conflicts are commonplace in almost every project. A project environment that supports the decision making and trust among team members, so they can resolve issues and find beneficial solutions are hallmarks of high-performing teams. A project manager must assist in creating and developing such an environment around the team. That sometimes means backing away from situations where the project manager is not a value-add and allowing the project team to problem solve and decide. While this option sounds counter-intuitive, under the circumstances described in the scenario, withdrawing from the conflict and not making the decision is the best course of action for the project manager.

**Details for Each Option:**

A. Aside by the decision of the most senior team member
   - Incorrect. Although experience or tenure at a company may provide one with more knowledge and leverage a certain advantage, requiring the team members to go with the decision of the most senior person is most likely not the best way to resolve a technical issue. Sometimes, junior team members have innovative ideas that are better than the old tested approaches.

B. Avoid being involved in the discussion and decision making
   - Correct. The project manager does not have the information and insight to help the team members come to a resolution. The inclusion of the project manager is not of benefit.

C. Stop the discussion and direct the team members to get back to work
   - Incorrect. The scenario suggests the team members are arguing over technical detail. Stopping the discussion would not resolve the issue.

D. Request the human resource department’s representative to step in
   - Incorrect. There is nothing in the scenario to suggest the issue is personal warranting the representative of the human resource department to step in.

**Reference:**


**Emotional intelligence**

Emotional intelligence is the ability to identify, assess, and manage the personal emotions of oneself and other people, as well as the collective emotions of groups of people. The team can use emotional intelligence to reduce tension and increase cooperation by identifying, assessing, and controlling the sentiments of project team members, anticipating their actions, acknowledging their concerns, and following up on their issues.

**Influencing**

Because project managers often have little or no direct authority over team members in a matrix environment, their ability to influence stakeholders on a timely basis is critical to project success. Key influencing skills include:

- Ability to be persuasive;
- Clearly articulating points and positions;
✓ High levels of active and effective listening skills;
✓ Awareness of, and consideration for, the various perspectives in any situation;
✓ Gathering relevant information to address issues and reach agreements while maintaining mutual trust.

**Leadership**

Successful projects require leaders with strong leadership skills. Leadership is the ability to lead a team and inspire them to do their jobs well. It encompasses a wide range of skills, abilities and actions. Leadership is important through all phases of the project life cycle. There are multiple leadership theories defining leadership styles that should be used as needed for each situation or team. It is especially important to communicate the vision and inspire the project team to achieve high performance.

Research describes numerous leadership styles that a project manager can adopt. Some of the most common examples of these styles include but are not limited to:

- Laissez-faire (e.g., allowing the team to make their own decisions and establish their own goals, also referred to as taking a hands-off style);
- Transactional (e.g., focus on goals, feedback, and accomplishment to determine rewards; management by exception);
- Servant leader (e.g., demonstrates commitment to serve and put other people first; focuses on other people’s growth, learning, development, autonomy, and well-being; concentrates on relationships, community and collaboration; leadership is secondary and emerges after service);
- Transformational (e.g., empowering followers through idealized attributes and behaviors, inspirational motivation, encouragement for innovation and creativity, and individual consideration);
- Charismatic (e.g., able to inspire; is high-energy, enthusiastic, self-confident; holds strong convictions);
- Interactional (e.g., a combination of transactional, transformational, and charismatic).

**Example of the question:**

A new project manager takes over a project and holds a team meeting to introduce himself and explain his leadership style. He tells the team members that he wants them to work independently, and that he will allow the team to make their own decisions and establish their own goals.

*What leadership style does the project manager demonstrate?*

A [ ] Service-oriented
B [ ] Avoiding
C [ ] Referent
D [ ] Laissez-faire

**Answer:**
Outputs of this process are: Change requests; Project management plan updates: (Resource management plan, Schedule baseline, Cost baseline); Project documents updates: (Issue log, Lessons learned register, Project team assignments); Enterprise environmental factors updates.

Team management begins as soon as the project team comes together, and it ends as soon as the project is closed. Throughout the project, different conditions and scenarios will affect how the project manager and the project management team will manage the project and the resources within it. There are four outputs of managing the project team:

**Requested changes:** Seems like just about everything can result in a change request, doesn’t it? Changes to the project team can have ripple effects on the project scheduling, project cost, and even the project scope statement, so a change request is needed when these conditions are true. Corrective actions can include moving people to different assignments, outsourcing some of the project work, and replacing project team members who may have left the organization or project. Preventive actions can include cross-training, role clarification, and even additional labor through hiring or procurement to ensure that all of the project work is completed as planned.

**Project management plan updates:** As with any other area of project management, if the project management plan needs to be updated, it should be. Project management plan updates could include updates to the resource management plan, schedule baseline, and the cost baseline.

**Project document updates:** Updates to the issue log, lessons learned register, and team assignments should be reflected in the project documents as needed. You may need to update the roles and responsibility charts, such as your RACI chart, to reflect the changes within the project and/or project team.

**Enterprise environmental factor updates:** It is possible that your management approach could affect the enterprise environmental factors within your organization. You may need to update the process for performance appraisals and any information about project team members’ new skills as a result of the project training.

**Relating to Organizational Theories**

You can expect to see some of these topics on your exam, so let’s have a look at these theories in more detail.

**Maslow’s Hierarchy of Needs**

According to Abraham Maslow, people work to take care of a hierarchy of needs. The pinnacle of their needs is self-actualization. People want to contribute, prove their worth, and use their skills and abilities. The picture below shows the pyramid of needs that all people try to ascend by fulfilling each layer, one at a time.
Maslow’s theory states that people ultimately work for self-actualization. Maslow’s five layers of needs, from lowest to highest, are:

- Physiological: People require these necessities to live: air, water, food, clothing, and shelter.
- Safety: People need safety and security. This can include stability in life, work, and culture.
- Social: People are social creatures and need love, approval, and friends.
- Esteem: People strive for the respect, appreciation, and approval of others.
- Self-actualization: At the pinnacle of needs, people seek personal growth, knowledge, and fulfillment.

Herzberg’s Theory of Motivation

According to Frederick Herzberg, a psychologist and authority on the motivation of work, there are two catalysts for success with people:

- Hygiene agents: These elements are the expectations all workers have. They include job security, a paycheck, clean and safe working conditions, and a sense of belonging, civil working relationships, and other basic attributes associated with employment.
- Motivating agents: These are the elements that motivate people to excel. They include responsibility, appreciation of work, public recognition for a job well done, the chance to excel, education, and other opportunities associated with work aside from financial rewards.

This theory says that the presence of hygiene factors will not motivate people to perform because these are expected attributes. However, the absence of these elements will demotivate performance. For people to excel, the presence of motivating factors must exist. Picture below illustrates Herzberg’s Theory of Motivation.

Hygiene agents do nothing to motivate, but their absence will cause performance and morale to decline.
Douglas McGregor’s theory states that, from their perspective, management believes there are two types of workers, good and bad, as seen in the picture below. Theory X sees workers as lazy and uninterested in doing the project work, and they must be micromanaged and coerced to do the work. Theory Y sees workers as good, self-directed, and able to do the work that’s assigned to them.

Management believes that X people are bad and Y people are good

X is bad. These people need to be watched all the time, micromanaged, and cannot be trusted. X people avoid work, shun responsibility, and lack the aptitude to achieve. Y is good. These people are self-led, motivated, and can accomplish new tasks proactively.

**Example of the question:**

**You are the project manager in your organization. Your project is part of a larger program led by Nancy Whiting. Nancy is a believer of McGregor’s Theory of X and Y. Which of the following is an example of Theory X?**

A. Self-led project teams  
B. Micromanagement  
C. Team members able to work on their own accord  
D. Earned value management

**Answer:** Right answer is B. Theory X states that workers have an inherent dislike of work and will avoid it if possible. With regard to this theory, micromanagement is a method used to make certain workers complete their work. A and C are actually examples of McGregor’s Theory Y. D is incorrect because EVM is not directly related to McGregor’s Theory of X and Y.

**Ouchi’s Theory Z**

William Ouchi’s theory is based on the Japanese participative management style. This theory states that workers are motivated by a sense of commitment, opportunity, and advancement. Workers in an organization subscribing to Theory Z learn the business by moving up through the ranks of the company.

**EXAM TIP:** If you need a way to keep McGregor’s X and Y and Ouchi’s Z theories separate in your mind, think of this: X is bad, Y is good, Z is the best.

Ouchi’s theory also credits the idea of lifetime employment. Workers will stay with one company until they retire because they are dedicated to the company, which in turn dedicated to them.

**NOTE.** Mary is a good software developer, so she would be a good project manager of software development projects, right? Not necessarily. This is the **halo effect**—when you make a judgment about a person based on seemingly related characteristics. Just because a person is skilled in one area does not mean they will also be skilled in another somewhat related area.
Example of the question:
Management has approached Tyler, one of your project team members. Tyler is a database administrator and developer whose work is always on time, accurate, and of quality. He also has a reputation of being a “good guy” and is well liked. Because of this, management has decided to move Tyler into the role of a project manager for a new database administration project. This is an example of which of the following?
A. Management by exception
B. The halo effect
C. Management by objectives
D. McGregor’s Theory of X and Y
Answer: Right answer is B. The halo effect is the assumption that because the person is good at a technology, he would also be good at managing a project dealing with that said technology. A, C, and D are all incorrect because these do not describe the halo effect.

Vroom’s Expectancy Theory
Vroom’s Expectancy Theory states that people will behave based on what they expect as a result of their behavior. In other words, people will work in relation to the expected reward of the work. If the attractiveness of the reward is desirable to the worker, she will work to receive it. In other words, people expect to be rewarded for their effort.

McClelland’s Theory of Needs
David McClelland developed his acquired-needs theory based on his belief that a person’s needs are acquired and develop over time. These needs are shaped by circumstance, conditions, and life experiences for each individual. McClelland’s Theory of Needs is also known as the Three Needs Theory, because there are just three needs for each individual. Depending on the person’s experiences, the order and magnitude of each need shifts:
Need for achievement: These people need to achieve, so they avoid both low-risk and high-risk situations. Achievers like to work alone or with other high achievers, and they need regular feedback to gauge their achievement and progress.
Need for affiliation: People, who have a driving need for affiliation look for harmonious relationships, want to feel accepted by people, and conform to the norms of the project team.
Need for power: People, who have a need for power, are usually seeking either personal or institutional power. Personal power generally is the ability to control and direct other people. Institutional power is the ability to direct the efforts of others for the betterment of the organization.
McClelland developed the Thematic Apperception Test to determine what needs are driving individuals. The test is a series of pictures that the test-taker must create a story about. Through the storytelling, the test-taker will reveal which need is driving his or her life at that time.

Again – Remember:

<table>
<thead>
<tr>
<th>Domain III</th>
<th>Executing – 31%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1</td>
<td>Acquire and manage project resources by following the human resource and procurement management plans in order to meet project requirements.</td>
</tr>
<tr>
<td>Task 2</td>
<td>Manage task execution based on the project management plan by leading and developing the project team in order to achieve project deliverables.</td>
</tr>
</tbody>
</table>

9.6 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. 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 and are released when no longer needed. This process is performed throughout the project.

The Control Resources process ensures that all physical resources (materials and equipment) are assigned, utilized, and released in accordance with the plan. The resource management plan established the guidelines for how physical resources will be controlled. The Control Resource process will carry out that plan. Like all processes within the Monitoring and Controlling process group, the emphasis is verifying that the plan and actual performance match. If there is a variance, determine the source of the variance and corrective actions if required.

Updating resource allocation requires knowing what actual resources have been used to date and what is still needed. This is done mainly by reviewing the performance usage to date. Control Resources is concerned with:

- Monitoring resource expenditures,
- Identifying and dealing with resource shortage/surplus in a timely manner,
- Ensuring that resources are used and released according to the plan and project needs,
- Informing appropriate stakeholders if any issues arise with relevant resources,
- Influencing the factors that can create resources utilization change,
- Managing the actual changes as they occur.

Any changes needed to the schedule or cost baselines can be approved only through the Perform Integrated Change Control process.

**Inputs of this process are:** Project management plan: (Resource management plan); Project documents: (Issue log, Lessons learned register, Physical resource assignments, Project schedule, Resource breakdown structure, Resource requirements, Risk register); Work performance data; Agreements; Organizational process assets.

**Project management plan:** In particular, the subsidiary resource management plan;

**Project documents:** The issue log, lessons learned register, physical resource assignments, schedule, resource breakdown structure, resource requirements, and the risk register;

**Example of the question:**

For a construction project, a project manager wants to ensure that critical earth-moving equipment such as excavators, loaders, backhoes, and bulldozers are available as planned. The project manager needs to review a project document, which describes the expected utilization of that equipment along with details such as type, amount, and location. What project document does the project manager need?

A. Issue log
B. Project schedule
C. Resource assignment register
D. Physical resource assignments

**Answer:**
Work performance data: Raw data gathered on project status and resource utilization;

Agreements Contracts and agreements with vendors and groups regarding the project resources;

Organizational process assets: Policies for resource control, resource assignment, escalation processes, and lessons learned from similar projects.

Tools and Techniques for this process are: Data analysis: (Alternatives analysis, Cost-benefit analysis, Performance reviews, Trend analysis); Problem solving; Interpersonal and team skills: (Negotiation, Influencing); Project management information system.

Data analysis

Alternatives analysis: When a resource is not available—perhaps a vendor can’t deliver the physical resource as promised—analysis is used to determine whether another resource could work or a different vendor could deliver the solution. Analysis can also involve an examination of what the late delivery would mean to the project schedule and whether the project team can work on other tasks while waiting for the delivery for the resource from the vendor.

Cost-benefit analysis: This analysis helps to determine the best corrective action in terms of cost in case of project deviations.

Performance reviews are also part of controlling resources. The project manager can compare the actual performance of physical resources to the planned performance of the resources. If the performance of a planned resource is not meeting expectations, the project manager can use cost-benefits analysis to determine whether changing vendors, materials, or both is cost efficient.

Trend analysis will enable you to examine how well physical resources have performed and to identify trend lines in the analysis to plan for future work. For some materials or equipment, the trend line may reflect the learning curve of using the resource. If the project team members have never used a material before, for example, it will likely take some time for the team to learn the best application of the material, develop an approach to doing the work, and master the use of the material. A trend line can track this progress over time.

Example of the question:

Which of the following data analysis techniques would be best for determining the resources needed at upcoming stages of the project and to see if performance has been improving or deteriorating over time?

A Cost-benefit analysis
B Trend analysis
C Performance reviews
D Project management information system (PMS)
Problem-solving

These issues with materials are a common activity of the project manager or experts on the project team. When materials aren’t working as expected, you’ll need to create a solution to keep the project moving forward. Problems can come from inside the organization, such as equipment damaged by a team member, or from outside the organization, such as a vendor that can’t deliver, bad weather, or other external issues. When problem-solving, use methodical, logical steps to find a solution:

- Identify the problem, not the evidence of the problem.
- Break the problem down into manageable chunks.
- Investigate the problem, collect data, and experience the problem.
- Analyze the problem to discover the root causes.
- Find a solution that’s time and cost efficient.
- Confirm the solution is working.
Example of the question:

As a project manager, you monitor resource availability and determine that a machine, which is needed for the testing is down for unscheduled maintenance, which will cause a two-day delay. To avoid the delay, you check alternatives and discover that you can swap this type of test with another activity.

What tool or technique did you use?

A. Acquire Resources
B. Problem solving
C. Contingency reserve
D. Control Resources

Answer:

Outputs of this process are: Work performance information; Change requests; Project management plan updates: (Resource management plan, Schedule baseline, Cost baseline); Project documents updates: (Assumption log, Issue log, Lessons learned register, Physical resource assignments, Resource breakdown structure, Risk register).

Controlling resources is an ongoing activity throughout the project. The first output of the process is work performance information. Work performance information is useful data about the performance of the physical resources in the project. This information can help the project manager determine whether a change request is needed for the materials. Change requests are the second output of this process; all change requests must be submitted to the project’s integrated change control process. The project management plan could need to be updated as a result of controlling resources. When the project management plan is updated, a change request should be submitted as well. Changes can occur to the project management plan as a result of controlling resources such as the following:

✓ Resource management plan: Results of resources should be compared to what was planned for the resources.
✓ **Schedule baseline:** Any changes to the project schedule resulting from controlling resources should be reflected in the schedule baseline.

✓ **Cost baseline:** Defects, changes in the price of materials, and other changes to the costs of the resources must be updated and reflected in the cost baseline.

The process of controlling resources can also require that several project documents be updated:

✓ **Assumptions log.** Any assumptions about the physical resources that could affect the project should be logged.

✓ **Issue log.** Issues are risks that have happened; issues with physical resources must be documented, tracked and monitored.

✓ **Lessons learned register:** What was learned about the physical resources is documented.

✓ **Physical resource assignments:** Should the assignments for the physical resources change, the change needs to be documented and updated.

✓ **Resource breakdown structure:** Where the resources are utilized in the project can be reflected in the resource breakdown structure.

✓ **Risk register:** Any risks that are introduced or changed as a result of physical resources must be updated in the risk register.

*It is important to remember that the Control Resources process is concerned with physical resources while the Manage Team process is concerned with human resources.*

**Use Your Resources**

**Effectively**

**Efficiently**

**Economically**