



**VISION INSTITUTE OF TECHNOLOGY,  
SUBJECT: PROJECT MANAGEMENT AND PLANNING  
UNIT 3: NETWORK TECHNIQUES**

**UNIT: 3**

- Network Techniques: Development of Project Network, Time Estimation (Simple Practical Problem with EST, EFT, LST, LFT, Total Float)
- Determination of the Critical Path, Scheduling when Resources are limited, PERT Model, CPM Model (Simple Practical Problem of Crashing), Network Cost System)

**OUTCOMES:**

1. **Development of Project Network:** Involves creating a visual representation of tasks and their dependencies.
2. **Time Estimation:** Includes determining the duration of each task. EST (Early Start Time), EFT (Early Finish Time), LST (Late Start Time), LFT (Late Finish Time), and Total Float help in scheduling.
3. **Critical Path:** Identifies the longest path in the network, indicating the minimum time needed for project completion. Tasks on the critical path have zero float.
4. **Scheduling with Limited Resources:** Involves optimizing task schedules considering resource constraints.
5. **PERT Model:** Program Evaluation and Review Technique uses three time estimates (optimistic, pessimistic, and most likely) to estimate task durations probabilistically.
6. **CPM Model:** Critical Path Method focuses on determining the critical path and managing project time efficiently. Crashing involves shortening the duration of critical path activities.
7. **Network Cost System:** Involves tracking and managing costs associated with project activities.



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#### ❖ Development of Project Network



The development of a project network is a fundamental step in project management. It involves creating a visual representation that illustrates the relationships and dependencies among various tasks or activities required to complete a project. The primary purpose of developing a project network is to provide a clear and structured overview of the project's workflow.

#### Here's how the process typically works:

1. **Identifying Tasks:** The first step is to break down the entire project into smaller, manageable tasks. These tasks should represent the specific activities that need to be accomplished to achieve the project's objectives.
2. **Defining Dependencies:** Once the tasks are identified, the next step is to determine the dependencies among them. Dependencies indicate the sequence in which tasks must be performed. Some tasks may need to be completed before others can start, while some may be independent and can occur simultaneously.
3. **Creating a Visual Representation:** The project network is then created by representing each task as a node (or a box) and connecting them with arrows to indicate the flow and dependencies. Arrows typically point from the predecessor task to the successor task, showing the direction of the workflow.
4. **Critical Path Analysis:** The project network helps identify the critical path, which is the longest sequence of dependent tasks that determines the minimum time needed to complete the project. Tasks on the critical path have zero float, meaning any delay in these tasks will directly impact the project's overall timeline.
5. **Resource Allocation:** The project network also aids in resource allocation and management. It provides a visual guide for understanding which tasks can be performed concurrently and which resources are required at each stage.



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❖ **Time Estimation:**



Time estimation is a crucial aspect of project management that involves determining the duration of each task or activity in a project. Accurate time estimation is essential for creating realistic project schedules and ensuring that projects are completed within the specified time frame.

Several key concepts, including Early Start Time (EST), Early Finish Time (EFT), Late Start Time (LST), Late Finish Time (LFT), and Total Float, play a role in the scheduling process.

1. **Early Start Time (EST):** This is the earliest point in time when a particular task can begin, based on the project's schedule and dependencies. It considers the start times of preceding tasks and any constraints related to resource availability.
2. **Early Finish Time (EFT):** This represents the earliest point in time when a task can be completed. It considers both the duration of the task and the Early Start Time.
3. **Late Start Time (LST):** This is the latest point in time when a task can start without delaying the project's overall schedule. Late Start Time considers the project's deadline or target completion date and the total float available for the task.
4. **Late Finish Time (LFT):** This is the latest point in time when a task must be finished to avoid delaying the project. It considers both the duration of the task and the Late Start Time.
5. **Total Float:** Total Float is the amount of time that a task can be delayed without affecting the project's overall schedule. It is calculated by finding the difference between the Late Start Time and Early Start Time or Late Finish Time and Early Finish Time for a particular task.

These time estimation parameters help project managers in the following ways:

- **Scheduling:** By understanding the early and late start times for each task, project managers can create a detailed project schedule that accounts for dependencies and resource constraints.
- **Critical Path Analysis:** The concepts of EST, EFT, LST, LFT, and Total Float are instrumental in identifying the critical path, which consists of tasks with zero total float. The critical path determines the minimum time required to complete the project.
- **Resource Management:** By analyzing early and late start times, project managers can allocate resources efficiently, ensuring that critical tasks are appropriately staffed to meet deadlines.



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❖ **Critical Path:**



The Critical Path is a key concept in project management and represents the longest path through a project network, indicating the minimum time required to complete the entire project. The critical path is critical because any delay in the tasks on this path would directly impact the overall project timeline. Here's a breakdown of the critical path and its characteristics:

1. **Longest Path:** The critical path is the sequence of tasks in a project that, when combined, have the longest total duration. It represents the path from the project's start to its finish that has no flexibility in terms of time. If any task on the critical path is delayed, the entire project will be delayed.
2. **Minimum Time for Completion:** The critical path determines the minimum time needed for the project to be completed. It identifies the tasks that must be executed in a specific order without any delays to ensure the project's timely completion.
3. **Tasks with Zero Float:** Float, also known as slack, is the amount of time a task can be delayed without affecting the project's overall timeline. Tasks on the critical path have zero float because any delay in these tasks directly extends the project's duration. Therefore, there is no flexibility or slack in the critical path tasks.
4. **Focus for Project Managers:** Project managers often focus their attention on tasks within the critical path because these are the activities that have the greatest impact on the project's schedule. Efficient management of critical path tasks is essential for completing the project on time.
5. **Identification:** Critical path analysis involves identifying the critical path by evaluating the dependencies and durations of tasks in the project network. Various scheduling techniques, such as the Critical Path Method (CPM), are used to perform this analysis.
6. **Critical Path Changes:** Throughout the project, the critical path may change based on progress and changes in task durations. New critical paths may emerge, and some tasks may lose their critical status.



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❖ **Scheduling with Limited Resources:**



Scheduling with limited resources is a common and challenging aspect of project management. It involves creating an efficient project schedule that achieves project goals within a given timeframe, while also considering constraints on resources such as personnel, equipment, materials, or budget. The objective is to optimize the use of available resources to ensure project tasks are completed efficiently and effectively. Here's how it's approached and why it's important:

**Key Aspects of Resource-Limited Scheduling**

1. **Resource Allocation:** Identifies which resources are needed for each task and assigns them in a manner that avoids over-allocation or underutilization. This requires a clear understanding of the capacity and capabilities of each resource.
2. **Resource Leveling:** A technique used to address resource allocation problems by adjusting the start and finish dates of tasks to smooth out the demand for each resource over time. This may involve delaying tasks to balance resource use, with the aim of minimizing peaks and troughs in resource demand.
3. **Resource Smoothing:** Similar to resource leveling, but the key difference is that the project's end date is fixed. The goal is to adjust the resource usage without affecting the project's critical path and completion date.
4. **Priority Assignment:** Involves ranking tasks based on their importance or urgency to ensure that critical tasks have priority access to limited resources. This helps in focusing resources on high-priority tasks to avoid delays in the project's schedule.

**Challenges**

- **Resource Conflicts:** Occur when more tasks require a particular resource than what is available. Resolving these conflicts requires careful planning and sometimes negotiation among project stakeholders.
- **Flexibility:** Resource limitations often require project managers to be flexible in their planning and execution, sometimes requiring a shift in strategies, such as outsourcing or re-prioritizing tasks.



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- **Monitoring and Adjustment:** Projects rarely go exactly as planned. Continuous monitoring of resource utilization and project progress is necessary to identify issues early and adjust the schedule or resources as needed.

#### Benefits

- **Cost Efficiency:** Optimizing resource allocation can reduce project costs by avoiding the need for overtime, rush orders, or additional hiring.
- **Improved Resource Utilization:** Efficient scheduling ensures that resources are used effectively throughout the project, minimizing idle time.
- **Enhanced Project Planning:** Considering resource constraints from the beginning encourages more realistic and achievable project plans.

#### Techniques and Tools

Several project management techniques and software tools can assist in scheduling with limited resources, including:

- **Critical Path Method (CPM):** Helps identify tasks that must be closely managed to ensure project completion on time but may need to be adjusted for resource constraints.
- **Program Evaluation and Review Technique (PERT):** Allows for probabilistic task time estimates, useful in planning with uncertainties in resource availability.
- **Gantt Charts and Project Management Software:** Tools like Microsoft Project, Primavera, and others can model resource allocations, identify bottlenecks, and help manage the schedule dynamically.

#### ❖ PERT Model



The Program Evaluation and Review Technique (PERT) is a project management tool used to plan, schedule, and control complex projects. Developed in the 1950s by the U.S. Navy for the Polaris submarine missile program, PERT is particularly useful in projects where time is a critical factor and there is a degree of uncertainty in the estimates of the duration of activities. It is widely used in



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research and development projects, construction projects, and any project involving innovative processes where time estimation is challenging.

➤ **Key Features of PERT**

- **Activity Time Estimates:** PERT uses three types of time estimates for each activity or task within a project:
  - **Optimistic Time (O):** The minimum possible time required to complete a task, assuming everything proceeds better than is normally expected.
  - **Pessimistic Time (P):** The maximum possible time required to complete a task, assuming everything goes wrong (but excluding major catastrophes).
  - **Most Likely Time (M):** The best estimate of the time required to complete the task, assuming everything proceeds as normal.
- **Probabilistic Time Estimates:** By considering these three time estimates, PERT calculates an expected time for each task that accounts for the uncertainties in the estimates. The formula for calculating the expected time (TE) for a task is:
- **Critical Path:** Like other project management methodologies, PERT involves identifying the critical path, which is the longest path through the project with the least amount of slack. Tasks on the critical path determine the project's minimum completion time.
- **Network Diagrams:** PERT uses network diagrams to visualize the tasks in a project, their dependencies, and the sequence in which they must be completed. These diagrams help in identifying the critical path and understanding the relationship between various tasks.

➤ **Benefits of PERT**

- **Handles Uncertainty:** PERT's use of three time estimates for each task helps in managing the uncertainty inherent in the duration of tasks, providing a more realistic view of the project timeline.
- **Focus on Critical Path:** By identifying the critical path, PERT helps managers focus on the tasks that are crucial for the project's timely completion.
- **Improved Planning and Coordination:** The visual representation of tasks and their dependencies in a PERT chart aids in better planning and coordination among team members.
- **Resource Allocation:** Understanding the project timeline and critical tasks helps in effective resource allocation and prioritization.

➤ **Limitations of PERT**

- **Estimation Challenges:** The accuracy of PERT heavily relies on the time estimates for tasks. Poor estimates can lead to inaccurate project timelines.
- **Complexity:** For very large projects, the PERT chart can become unwieldy and difficult to manage.



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- **Overemphasis on Time:** While PERT focuses on time estimation and the critical path, it may not adequately address resource allocation or cost management directly.

#### ❖ CPM Model:



The Critical Path Method (CPM) is a step-by-step project management technique for process planning that focuses on identifying the sequence of critical tasks essential to project completion. By determining the longest stretch of dependent activities and measuring the time required to complete them from start to finish, CPM is particularly useful for ensuring project completion within the minimum possible timeframe. This method is widely used in various types of projects, including construction, aerospace, and defence sectors, to facilitate timely and efficient project execution.

#### ➤ Key Components of CPM:

- **Critical Path:** The core of CPM is the identification of the critical path, which is the longest duration path through a project. Tasks on this path cannot be delayed without affecting the project's completion date. These tasks have zero float or slack, meaning there is no spare time.
- **Task Duration:** For each task, a specific duration is estimated. Unlike PERT, which uses three-time estimates to account for uncertainty, CPM typically uses a single, deterministic time estimate for each task's duration.
- **Dependencies:** CPM requires a clear understanding of the dependencies between tasks. Some tasks cannot start until others are completed. These dependencies help in determining the sequence of activities.
- **Network Diagrams:** CPM uses network diagrams to illustrate tasks as nodes and the dependencies between them as edges. This visual representation helps in understanding the project structure and identifying the critical path.

#### ➤ Crashing:

Crashing is a specific technique used in CPM to shorten the project duration without altering the project's scope. This involves adding resources to critical path tasks to reduce their duration. However, crashing is only applied to critical path activities because accelerating non-critical tasks will not impact the overall project completion time.





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➤ **Steps in Crashing:**

1. **Identify the Critical Path:** Determine the current critical path and the activities on it.
2. **Analyze Costs:** Evaluate the cost implications of reducing the duration of critical path activities. This often involves a cost-time tradeoff, where the goal is to achieve the greatest time reduction for the least additional cost.
3. **Select Activities for Crashing:** Choose activities on the critical path that can be completed more quickly by allocating additional resources. The decision is based on the potential to reduce project duration at minimal cost.
4. **Adjust the Project Plan:** After selecting activities for crashing, update the project schedule to reflect the reduced durations and any changes in resource allocation.
5. **Re-evaluate the Critical Path:** Crashing can change the critical path. It's essential to reanalyze the project to ensure that the new critical path is identified and managed.

➤ **Benefits of CPM:**

- **Efficient Time Management:** CPM focuses on minimizing the project duration by efficiently managing the critical path.
- **Resource Optimization:** Helps in planning and optimizing the use of resources throughout the project.
- **Improved Planning and Control:** Provides a clear framework for project planning, execution, and monitoring.

➤ **Limitations:**

- **Assumption of Clear Task Durations:** CPM assumes that the duration of tasks is known and constant, which may not always be the case.
- **Cost of Crashing:** While crashing can reduce project time, it often leads to increased costs due to overtime, additional resources, or other factors.
- **Dynamic Nature of Projects:** Projects can change, requiring ongoing analysis and adjustments to the critical path and project plan.

❖ **Network Cost System**

A Network Cost System is a project management approach that involves tracking and managing costs associated with various project activities using a network-based structure. It integrates cost management with the planning and scheduling aspects of a project, providing a comprehensive view of the relationship between tasks, resources, and expenses. The primary goal is to ensure that the project is completed within the allocated budget and that resources are used efficiently.

Here are the key components and aspects of a Network Cost System:



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1. **Integration with Project Network:** The Network Cost System is closely tied to the development of a project network, where tasks, dependencies, and durations are identified. Each task in the network is associated with specific costs, and these costs are integrated into the project plan.
2. **Cost Estimation for Each Activity:** Before the project begins, a detailed cost estimation is performed for each activity or task in the project network. This includes direct costs (such as labour, materials, and equipment) as well as indirect costs (overheads, administrative expenses, etc.).
3. **Resource Cost Allocation:** The system allocates costs to resources based on their utilization in different activities. This allows for a more accurate understanding of how resources contribute to overall project costs.
4. **Budgeting:** Once the costs for individual activities are estimated, an overall project budget is established. This budget includes both direct and indirect costs associated with the project's completion.
5. **Monitoring and Control:** During project execution, the Network Cost System provides a mechanism for monitoring actual costs against the budgeted costs. This involves tracking expenses, resource utilization, and any changes in the project scope or plan that may impact costs.
6. **Earned Value Management (EVM):** EVM is often integrated into a Network Cost System to assess project performance. It compares the value of work performed to the actual cost, providing insights into project efficiency and performance against the budget.
7. **Variance Analysis:** Variance analysis is a crucial aspect of cost management within a Network Cost System. It involves comparing the planned costs to the actual costs and identifying any variances. Variances may result from changes in scope, resource rates, unexpected events, or inaccuracies in the initial cost estimates.
8. **Forecasting:** The Network Cost System allows for forecasting future costs based on the current project status and performance. This forecasting helps in proactive decision-making and adjustments to keep the project on track.
9. **Reporting:** Regular reporting is generated to communicate cost-related information to project stakeholders. This includes detailed breakdowns of costs by activity, resource, and overall project costs.

#### Benefits of Network Cost System:

- **Improved Cost Visibility:** Provides a clear understanding of where project costs are allocated, allowing for better management and control.
- **Proactive Decision-Making:** Enables project managers to make informed decisions based on real-time cost data, helping to prevent budget overruns.



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- **Efficient Resource Allocation:** Facilitates the optimization of resource usage by linking resource costs to specific project activities.

**Challenges:**

- **Accuracy of Cost Estimates:** The accuracy of the Network Cost System heavily relies on the precision of initial cost estimates. Inaccurate estimates can lead to budget deviations.
- **Dynamic Nature of Projects:** Projects are subject to change, and unexpected events may impact costs. Adapting the system to changing project conditions is a continuous challenge.

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❖ **Multiple choice questions:**

**Q1. What is the first step in developing a project network?**

- A) Defining dependencies
- B) Identifying tasks
- C) Creating a visual representation
- D) Resource allocation

**Answer: B) Identifying tasks**

**Q2. Dependencies in a project network indicate:**

- A) The cost of tasks
- B) The sequence in which tasks must be performed
- C) The duration of tasks
- D) The resources needed for tasks

**Answer: B) The sequence in which tasks must be performed**

**Q3. In a project network, tasks are represented as:**

- A) Arrows
- B) Circles
- C) Boxes or nodes
- D) Lines

**Answer: C) Boxes or nodes**

**Q4. Arrows in a project network indicate:**

- A) The duration of tasks
- B) The direction of workflow
- C) The cost of tasks
- D) The resources needed for tasks

**Answer: B) The direction of workflow**

**Q5. The critical path is:**

- A) The shortest path through the project network
- B) The longest path through the project network
- C) The most cost-effective path through the project network
- D) The path with the most tasks

**Answer: B) The longest path through the project network**

**Q6. Tasks on the critical path have:**

- A) Maximum float
- B) Zero float
- C) Variable float based on resources
- D) No relation to float

**Answer: B) Zero float**



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**Q7. Early Start Time (EST) considers:**

- A) Only the duration of preceding tasks
- B) The start times of preceding tasks and resource availability
- C) Only resource availability
- D) The project's budget constraints

**Answer: B) The start times of preceding tasks and resource availability**

**Q8. Total Float is:**

- A) The total time a project can be delayed without impacting the deadline
- B) The amount of time a task can be delayed without affecting the project's overall schedule
- C) The difference between the actual duration and planned duration of a task
- D) The total cost overruns allowed in a project

**Answer: B) The amount of time a task can be delayed without affecting the project's overall schedule**

**Q9. Resource Leveling helps to:**

- A) Increase the project budget
- B) Speed up the project completion
- C) Smooth out the demand for resources over time
- D) Increase the number of resources

**Answer: C) Smooth out the demand for resources over time**

**Q10. Resource Smoothing differs from Resource Leveling in that:**

- A) It adjusts resources without affecting the project's end date
- B) It is used to extend the project's duration
- C) It reduces the overall cost of the project
- D) It increases the number of tasks in the critical path

**Answer: A) It adjusts resources without affecting the project's end date**

**Q11. The Critical Path Method (CPM) is primarily used for:**

- A) Cost estimation
- B) Time estimation and identifying the critical path
- C) Resource allocation
- D) Quality management

**Answer: B) Time estimation and identifying the critical path**

**Q12. Gantt Charts are used to:**

- A) Allocate resources
- B) Show task dependencies and durations visually
- C) Calculate the project budget
- D) Identify project stakeholders

**Answer: B) Show task dependencies and durations visually**



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**Q13. The Program Evaluation and Review Technique (PERT) is useful because it:**

- A) Allows for fixed task time estimates
- B) Eliminates the need for resources in project planning
- C) Allows for probabilistic task time estimates
- D) Simplifies the critical path to one clear path

**Answer: C) Allows for probabilistic task time estimates**

**Q14. Resource conflicts in a project typically arise from:**

- A) Too many resources available
- B) Tasks requiring more resources than are available
- C) Having no critical path
- D) Underestimating the project duration

**Answer: B) Tasks requiring more resources than are available**

**Q15. Continuous monitoring of a project is essential for:**

- A) Only documenting the project's progress
- B) Only managing stakeholder expectations
- C) Identifying issues early and adjusting the schedule or resources as needed
- D) Increasing the project budget

**Answer: C) Identifying issues early and adjusting the schedule or resources as needed**

**Q16. What is the purpose of creating a visual representation in project management?**

- A) To increase the project budget
- B) To illustrate relationships and dependencies among tasks
- C) To reduce the number of tasks
- D) To eliminate the need for a project manager

**Answer: B) To illustrate relationships and dependencies among tasks**

**Q17. In project management, a node represents:**

- A) A resource
- B) A task or activity
- C) A budget estimate
- D) A stakeholder

**Answer: B) A task or activity**

**Q18. A dependency in a project network can be characterized as all of the following except:**

- A) Mandatory
- B) Discretionary
- C) External
- D) Fixed

**Answer: D) Fixed**



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**Q19. Late Finish Time (LFT) is crucial for determining:**

- A) The earliest start of a project
- B) The latest point a task must be completed to avoid delays
- C) The total budget of the project
- D) The exact cost of a task

**Answer: B) The latest point a task must be completed to avoid delays**

**Q20. Which is not a direct output of time estimation in project management?**

- A) A detailed project schedule
- B) Project budget
- C) Critical path identification
- D) Resource allocation plan

**Answer: B) Project budget**

**Q21. The critical path in a project network is important because:**

- A) It consists of all the tasks in the project
- B) It shows the shortest path to complete the project
- C) It determines the project's minimum completion time
- D) It involves the least number of tasks

**Answer: C) It determines the project's minimum completion time**

**Q22. Float is a term used to describe:**

- A) The budget surplus for a project
- B) The amount of time a task can be delayed without affecting other tasks
- C) The extra resources assigned to a task
- D) The duration of the longest task

**Answer: B) The amount of time a task can be delayed without affecting other tasks**

**Q23. The main difference between resource leveling and resource smoothing is:**

- A) The impact on the project's end date
- B) The type of resources allocated
- C) The total project budget
- D) The number of tasks involved

**Answer: A) The impact on the project's end date**

**Q24. Priority assignment in resource-limited scheduling ensures:**

- A) Tasks are completed based on their return on investment
- B) High-priority tasks have access to necessary resources
- C) All tasks are treated equally
- D) Resources are distributed based on task duration

**Answer: B) High-priority tasks have access to necessary resources**



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**Q25. Which technique is not directly involved in scheduling with limited resources?**

- A) Gantt charts
- B) Resource leveling
- C) Cost-benefit analysis
- D) Priority assignment

**Answer: C) Cost-benefit analysis**

**Q26. In project management, the term "slack" is synonymous with:**

- A) Conflict
- B) Float
- C) Delay
- D) Overhead

**Answer: B) Float**

**Q27. A project's baseline is used to:**

- A) Estimate the project's final cost
- B) Track the actual progress against planned progress
- C) Allocate resources efficiently
- D) Identify the project's stakeholders

**Answer: B) Track the actual progress against planned progress**

**Q28. The method that involves drawing a project network diagram to show task dependencies is called:**

- A) The Waterfall method
- B) The Agile method
- C) The Critical Path Method (CPM)
- D) The Scrum methodology

**Answer: C) The Critical Path Method (CPM)**

**Q29. Which is not a common constraint in project management?**

- A) Scope
- B) Time
- C) Quality
- D) Flexibility

**Answer: D) Flexibility**

**Q30. Earned Value Management (EVM) is:**

- A) A technique for measuring project performance and progress
- B) A resource allocation method
- C) A budgeting technique
- D) A risk management tool

**Answer: A) A technique for measuring project performance and progress**





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**Q31. Fast tracking a project involves:**

- A) Reducing the project's scope
- B) Performing more activities in parallel
- C) Increasing the budget
- D) Extending the deadline

**Answer: B) Performing more activities in parallel**

**Q32. Crashing a project schedule means:**

- A) Adding more resources to critical path tasks to decrease total project time
- B) Reducing the project's scope
- C) Decreasing the number of tasks
- D) Increasing the project's budget without changing activities

**Answer: A) Adding more resources to critical path tasks to decrease total project time**

**Q33. OA Work Breakdown Structure (WBS) is primarily used to:**

- A) Allocate resources
- B) Break down the project into manageable sections
- C) Develop a timeline
- D) Set the budget

**Answer: B) Break down the project into manageable sections**

**Q34. Scope creep refers to:**

- A) The reduction in project scope due to budget cuts
- B) The expansion of the project scope without adjustments to time, cost, or resources
- C) A decrease in project resources over time
- D) An increase in project budget to meet scope requirements

**Answer: B) The expansion of the project scope without adjustments to time, cost, or resources**

**Q35. The primary purpose of a risk register in project management is to:**

- A) Document all project expenses
- B) Record and assess project risks and their mitigation strategies
- C) Track the allocation of resources
- D) Monitor the project schedule

**Answer: B) Record and assess project risks and their mitigation strategies**

**Q36. What is the primary objective of resource-limited scheduling in project management? a.**

- a. Minimizing project costs
- b. Maximizing project duration
- c. Achieving project goals within a given timeframe while optimizing resource use
- d. Ignoring resource constraints

**Answer: c. Achieving project goals within a given timeframe while optimizing resource use**



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- Q37. What does Resource Allocation involve in resource-limited scheduling?**
- a. Ignoring resource capacities
  - b. Identifying resources needed for each task and assigning them efficiently
  - c. Over-allocating resources
  - d. Underutilizing resources

**Answer: b. Identifying resources needed for each task and assigning them efficiently**

- Q38. How does Resource Leveling address resource allocation problems? \**
- a. By ignoring resource demand
  - b. By adjusting start and finish dates to smooth out resource demand
  - c. By prioritizing tasks randomly
  - d. By increasing resource demand

**Answer: b. By adjusting start and finish dates to smooth out resource demand**

- Q39. What is the key difference between Resource Levelling and Resource Smoothing?**
- a. Resource Levelling involves delaying tasks, while Resource Smoothing fixes the project's end date
  - b. Resource Levelling focuses on priority assignment; while Resource Smoothing does not
  - c. Resource Smoothing involves delaying tasks, while Resource Levelling fixes the project's end date
  - d. There is no difference between Resource Levelling and Resource Smoothing

**Answer: a. Resource Levelling involves delaying tasks, while Resource Smoothing fixes the project's end date**

- Q40. What does Priority Assignment involve in resource-limited scheduling?**
- a. Randomly assigning priorities to tasks
  - b. Ranking tasks based on importance or urgency
  - c. Ignoring task priorities
  - d. Allocating resources without considering task importance

**Answer: b. Ranking tasks based on importance or urgency**

- Q41. What is a common challenge in resource-limited scheduling related to tasks requiring a specific resource?**
- a. Flexibility
  - b. Monitoring and Adjustment
  - c. Resource Conflicts
  - d. Priority Assignment

**Answer: c. Resource Conflicts**

- Q42. Why do resource limitations often require project managers to be flexible in their planning and execution?**
- a. To avoid using resources efficiently
  - b. To stick to the original plan
  - c. Due to the dynamic nature of projects
  - d. Because resource limitations have no impact on planning

**Answer: c. Due to the dynamic nature of projects**



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- Q43. What is the significance of monitoring and adjustment in resource-limited scheduling?**
- a. To ensure project managers stick to the original plan
  - b. To identify issues early and make necessary schedule or resource adjustments
  - c. To avoid any changes in the project
  - d. To ignore resource utilization

**Answer: b. To identify issues early and make necessary schedule or resource adjustments**

- Q44. How can optimizing resource allocation contribute to cost efficiency in a project?**
- a. By ignoring resource utilization
  - b. By encouraging overtime and rush orders
  - c. By avoiding the need for overtime, rush orders, or additional hiring
  - d. By underutilizing resources

**Answer: c. By avoiding the need for overtime, rush orders, or additional hiring**

- Q45. What is the goal of resource smoothing in project management?**
- a. To delay tasks
  - b. To adjust resource usage without affecting the project's critical path and completion date
  - c. To prioritize low-importance tasks
  - d. To ignore resource constraints

**Answer: b. To adjust resource usage without affecting the project's critical path and completion date**

- Q46. In resource-limited scheduling, what does the term "Critical Path" refer to?**
- a. The most challenging tasks in a project
  - b. The path with the least amount of slack
  - c. Randomly selected tasks in a project
  - d. Tasks that can be delayed without impacting project completion

**Answer: b. The path with the least amount of slack**

- Q47. Which technique involves adjusting the start and finish dates of tasks to balance resource use over time?**
- a. Priority Assignment
  - b. Resource Smoothing
  - c. Crashing
  - d. Resource Allocation

**Answer: b. Resource Smoothing**

- Q48. What is the primary focus of the Critical Path Method (CPM) in project management?**
- a. Maximizing project costs
  - b. Minimizing project duration
  - c. Identifying tasks that must be closely managed to ensure project completion on time
  - d. Ignoring dependencies between tasks

**Answer: c. Identifying tasks that must be closely managed to ensure project completion on time**



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**Q49. What does PERT stand for in project management?**

- a. Project Estimation and Resource Tracking
- b. Program Evaluation and Review Technique
- c. Project Efficiency and Resource Timeliness
- d. Project Execution and Resource Tracking

**Answer: b. Program Evaluation and Review Technique**

**Q50. Which of the following is NOT a key feature of PERT?**

- a. Optimistic Time
- b. Pessimistic Time
- c. Regular Time
- d. Most Likely Time

**Answer: c. Regular Time**

**Q51. What is the main purpose of Crashing in the Critical Path Method (CPM)?**

- a. Delaying non-critical tasks
- b. Reducing project costs
- c. Shortening the project duration without altering the project's scope
- d. Ignoring critical path activities

**Answer: c. Shortening the project duration without altering the project's scope**

**Q52. Which project management technique allows for probabilistic task time estimates?**

- a. Gantt Charts
- b. Crashing
- c. PERT
- d. Resource Leveling

**Answer: c. PERT**

**Q53. How does CPM handle task duration estimates compared to PERT?**

- a. CPM uses three-time estimates for each task
- b. CPM uses a single, deterministic time estimate for each task's duration
- c. CPM ignores task durations
- d. CPM focuses on resource allocation

**Answer: b. CPM uses a single, deterministic time estimate for each task's duration**

**Q54. What is a potential limitation of PERT related to estimation?**

- a. Overemphasis on time
- b. Poor resource utilization
- c. Accurate task durations
- d. Complexity in project management

**Answer: b. Poor resource utilization**



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**Q55. In a Network Cost System, what is the role of Earned Value Management (EVM)?**

- a. Ignoring project costs
- b. Comparing the value of work performed to the actual cost
- c. Allocating costs to resources
- d. Establishing project budgets

**Answer: b. Comparing the value of work performed to the actual cost**

**Q56. What is the primary goal of a Network Cost System in project management?**

- a. Maximizing project costs
- b. Allocating resources randomly
- c. Ensuring project completion within the allocated budget
- d. Ignoring cost-related information

**Answer: c. Ensuring project completion within the allocated budget**

**Q57. How does Resource Leveling contribute to efficient resource use in project management?**

- a. By ignoring resource demand
- b. By prioritizing low-importance tasks
- c. By balancing resource demand over time to avoid peaks and troughs
- d. By over-allocating resources

**Answer: c. By balancing resource demand over time to avoid peaks and troughs**

**Q58. What is the significance of Variance Analysis in a Network Cost System?** a. Ignoring budget deviations

- b. Comparing planned costs to actual costs and identifying variances
- c. Allocating costs to resources
- d. Underestimating project costs

**Answer: b. Comparing planned costs to actual costs and identifying variances**

**Q59. In the context of Crashing in CPM, what is meant by "float" or "slack"?**

- a. Spare time available for non-critical tasks
- b. Delaying project completion
- c. Ignoring task dependencies
- d. Overallocating resources

**Answer: a. Spare time available for non-critical tasks**

**Q60. Why is flexibility crucial in resource-limited scheduling?**

- a. To stick to the original plan
- b. To avoid resource utilization
- c. Due to the dynamic nature of projects
- d. To prioritize tasks randomly

**Answer: c. Due to the dynamic nature of projects**



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**Q61. What does the term "Critical Path" imply in project management?**

- a. The easiest path in a project
- b. The path with maximum slack
- c. The longest duration path through a project with the least amount of slack
- d. Tasks that can be delayed without impact

**Answer: c. The longest duration path through a project with the least amount of slack**

**Q62. What role does Earned Value Management (EVM) play in a Network Cost System?**

- a. Ignoring project performance
- b. Comparing planned costs to actual costs
- c. Allocating resources to tasks
- d. Estimating project duration

**Answer: b. Comparing planned costs to actual costs**

**Q63. What is the primary focus of Crashing in CPM?**

- a. Ignoring the project's critical path
- b. Reducing project duration without altering the project's scope
- c. Maximizing project costs
- d. Allocating resources randomly

**Answer: b. Reducing project duration without altering the project's scope**

**Q64. How does a Network Cost System contribute to improved cost visibility?**

- a. By ignoring cost-related information
- b. By allocating costs randomly
- c. By providing a clear understanding of where project costs are allocated
- d. By underestimating project costs

**Answer: c. By providing a clear understanding of where project costs are allocated**

**Q65. What is a common challenge in Network Cost Systems related to project changes?**

- a. Static nature of projects
- b. Adapting to changing project conditions
- c. Ignoring cost deviations
- d. Overestimating project costs

**Answer: b. Adapting to changing project conditions**

**Q66. What is the primary purpose of a Gantt Chart in project management?**

- a. To detail the project team's vacation schedules
- b. To visually represent a project's timeline and task durations
- c. To calculate the exact cost of the project
- d. To list the project's stakeholders

**Answer: b. To visually represent a project's timeline and task durations**



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**Q67. In project management, what does the acronym WBS stand for?**

- a. Work Breakdown Structure
- b. Wide Bandwidth System
- c. Weekly Business Summary
- d. Work-Based Scheduling

**Answer: a. Work Breakdown Structure**

**Q68. What is the primary advantage of using the Critical Chain Project Management (CCPM) technique?**

- a. It eliminates the need for a project manager
- b. It increases the project duration
- c. It focuses on the resources for task completion to accelerate project delivery
- d. It requires no planning

**Answer: c. It focuses on the resources for task completion to accelerate project delivery**

**Q69. What does the term 'stakeholder' refer to in project management?**

- a. Only the project's financial investors
- b. Individuals or groups affected by or capable of affecting the outcome of a project
- c. The technology used in project tasks
- d. External vendors only

**Answer: b. Individuals or groups affected by or capable of affecting the outcome of a project**

**Q70. What is the main focus of Agile project management?**

- a. Rigidity and strict adherence to the plan
- b. Flexibility and customer satisfaction through continuous delivery
- c. Avoiding customer interaction
- d. Complete documentation before starting any work

**Answer: b. Flexibility and customer satisfaction through continuous delivery**

**Q71. In the context of risk management, what is a 'risk register'?**

- a. A document listing all approved project expenses
- b. A tool for tracking the interest rates on loans
- c. A document that identifies, assesses, and plans responses to project risks
- d. A list of unreliable project contractors

**Answer: c. A document that identifies, assesses, and plans responses to project risks**

**Q72. How does Scrum facilitate project management?**

- a. By eliminating all forms of communication
- b. Through fixed teams working in set phases with no review
- c. By organizing work in short sprints with regular reviews and adaptations
- d. By discouraging feedback from clients

**Answer: c. By organizing work in short sprints with regular reviews and adaptations**



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**Q73. What role does a 'Sponsor' play in project management?**

- a. Acts solely as a figurehead with no real responsibilities
- b. Provides financial resources and support for the project
- c. Is responsible for day-to-day management of the project team
- d. Handles technical tasks exclusively

**Answer: b. Provides financial resources and support for the project**

**Q74. What is 'scope creep' in project management?**

- a. The technical term for project documentation
- b. A method for estimating project costs
- c. The uncontrolled expansion to project scope without adjustments to time, cost, and resources
- d. A software tool for managing project tasks

**Answer: c. The uncontrolled expansion to project scope without adjustments to time, cost, and resources**

**Q75. Why is communication considered vital in project management?**

- a. It is only necessary during the planning phase
- b. It ensures all stakeholders are informed and can contribute to decision-making processes
- c. It is required by law in all countries
- d. It is solely for reporting to senior management

**Answer: b. It ensures all stakeholders are informed and can contribute to decision-making processes**

**Q76. What is the primary focus of Lean project management?**

- a. Maximizing project costs
- b. Adding as many features to the product as possible
- c. Maximizing value to the customer while minimizing waste
- d. Increasing the number of project meetings

**Answer: c. Maximizing value to the customer while minimizing waste**

**Q77. In project management, what does the term 'baseline' refer to?**

- a. The lowest level of acceptable quality
- b. A historical record of past projects
- c. The original project plan plus approved changes
- d. A list of banned project management software

**Answer: c. The original project plan plus approved changes**

**Q78. What is the main benefit of conducting a project post-mortem?**

- a. To assign blame for project failures
- b. To celebrate the project's success without reviewing challenges
- c. To identify lessons learned and improve future projects
- d. To finalize the project's budget

**Answer: c. To identify lessons learned and improve future projects**





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**Q79. In project scheduling, what does the acronym PERT stand for?**

- a. Project Estimation and Review Technique
- b. Program Evaluation and Review Technique
- c. Project Execution and Reporting Time
- d. Program Execution and Response Team

**Answer: b. Program Evaluation and Review Technique**

**Q80. Why is stakeholder engagement important in project management?**

- a. It is only important for large projects
- b. To ensure project decisions benefit from diverse perspectives and expertise
- c. Stakeholder engagement is a legal requirement
- d. It is solely for marketing purposes

**Answer: b. To ensure project decisions benefit from diverse perspectives and expertise**

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