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THADOMAL SHAHANI TSEC ENGINEERING COLLEGE

24/03/2025 * Assignment No: 02 *

• Q.1> Differentiate between CPM and PERT.

ANS →

	CPM	PERT
i>	CPM Stands for Critical Path Method.	i> PERT Stands for Project Evaluation and Review Technique.
ii>	CPM is a technique of Project management which is used to manage only certain activities of any Project.	ii> PERT is a technique of Project management which is used to manage uncertain activities of any Project.
iii>	It is activity oriented technique which means that network is constructed on the basis of activities.	iii> It is event oriented technique which means that network is constructed on the basis of event.
iv>	It is a deterministic model.	iv> It is a Probability model.
v>	It majorly focuses on Time-cost trade off as minimizing cost is more important.	v> It majorly focuses on time as meeting time target or estimation of percent completion is more important.
vi>	It is appropriate for reasonable time estimation.	vi> It is appropriate for high Precision time estimation.
vii>	It has repetitive nature of job.	vii> It has Non-repetitive nature of job.
viii>	There may be crashing because of certain time bound.	viii> There is no chance of crashing as there is no certainty of time
ix>	It uses dummy activities for representing sequence of activities.	ix> It doesn't use any dummy activities.
x>	It is suitable for construction projects.	x> It is suitable for projects which required research and development.

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Q.2> Explain the difference between:-

ANS → (1) Total Slack and Free Slack :→ Both these are concepts in Project Scheduling & Critical Path Analysis that indicate flexibility available in Scheduling activities.

	Total Slack	Free Slack
i>	The amount of time an activity can be delayed without delaying the Project Completion date.	i> The amount of time an activity can be delayed without delaying the Start of its immediate Successor (s).
ii>	Total Slack = Late Start - Early Start (OR) Late Finish - Early Finish.	ii> Free Slack = Earliest Start of next activity - Earliest Finish of current activity.
iii>	If used up, it may affect the overall Project Schedule.	iii> It does not affect the Project Completion date but may impact only one Successor task.
iv>	Helps in identifying activities that can be delayed without affecting deadlines.	iv> Useful for Scheduling flexibility without disturbing the next activity.
v>	Ex:- If an activity has a total Slack of 5 days, it can be delayed by 5 days before it affects the Project deadline.	v> Ex:- If an activity has free Slack of 3 days, it can be delayed by 3 days without affecting its immediate Successor.

(2) AON and AOA Diagrams :→ Both AON & AOA are network diagram techniques used in Project Scheduling.

	Activity-on-Node (AON)	Activity-on-Arrow (AOA)
i>	Activities are represented as nodes, and arrows show dependencies	i> Activities are represented as arrows, and nodes indicate events (Start/end Points).
ii>	Can represent all types of dependencies (Finish-to-Start, Start-to-Start, etc).	ii> Primarily represents Finish-to-Start relationships.
iii>	No Dummy activities are required.	iii> Dummy activities are sometimes needed to maintain logical sequencing.
iv>	Easier to Construct and interpret.	iv> More Complex.
v>	Used in Precedence Diagramming Method (PDM) and Modern Scheduling Software.	v> Used in Arrow Diagramming Method (ADM) but Less Common today.

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Q.3> Explain Risk identification, Risk Projection, RMMM Plan in detail.

ANS→ (1) Risk Identification :- Risk Identification is the Process of recognizing Potential risks that may affect the Project's Success. It involves analyzing internal and external factors that could cause Project delays, cost overruns, or failure.

⇒ Sources of Risk :→

(a) Technical Risks :- Incomplete requirements, new technology adoption.

(b) Financial Risks :- Budget overruns, funding shortages.

(c) Schedule Risks :- Delayed deliverables, unrealistic deadlines.

(d) Operational Risks :- Staff shortages, inadequate resources.

(e) External Risks :- Regulatory changes, supplier issues.

⇒ Techniques for Risk Identification :→

i> Brainstorming sessions.

ii> SWOT analysis (Strengths, Weaknesses, Opportunities, Threats).

iii> Reviewing Past Projects.

iv> Expert Judgment.

v> Fishbone diagrams.

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(2) Risk Projection :- Risk Projection involves assessing the Probability and impact of identified risks. This helps prioritize risks based on their severity.

⇒ Risk Impact Categories :→

(a) Low Impact :- Minimal effect on the Project.

(b) Moderate Impact :- Can delay Project components.

(c) High Impact :- Can cause Project failure.

⇒ Risk Probability Levels :→

(a) Low (0-30%) :- Unlikely but possible.

(b) Medium (30-70%) :- Likely to occur.

(c) High (70-100%) :- Almost certain.

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⇒ **Risk Assessment Methods :→**

i> Qualitative Analysis:- Using Ranking Scales (High, Medium, Low).

ii> Quantitative Analysis:- Using Statistical models, Probability Distributions.

iii> Risk Matrix:- A 3×3 OR 5×5 matrix mapping Probability vs Impact.

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(3) Risk Mitigation, Monitoring, and Management (RMMM) Plan :-

An RMMM Plan is a structured approach to managing risks throughout the Project Lifecycle.

(A) Risk Mitigation (Prevention Strategies) :-

i> Avoiding high-risk activities.

ii> Using backup plans.

iii> Allocating additional resources.

(B) Risk Monitoring (Tracking & Review) :-

i> Continuous risk assessments.

ii> Regular risk reports and meetings.

iii> Using Key Risk Indicators (KRIs).

(C) Risk Management (Action Plans) :-

i> Acceptance :- Proceeding with the risk while monitoring it.

ii> Transfer :- Outsourcing or insuring against risk.

iii> Reduction :- Implementing control measures.

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Q.4> Consider a XYZ Company undertake a Project to computerized working of ABC City Bank, then- (i) Develop W.B.S. for Same Project.
(ii) Develop Responsibility Matrix.

ANS→ XYZ Company undertakes a Project as follows:-

→ (i) Work Breakdown Structure (WBS) for Computerizing ABC City Bank :-

A WBS is a hierarchical decomposition of tasks required to complete a Project. It breaks down the project into manageable components.

Level 1 : Project - Computerization of ABC City Bank

[A] Requirement Analysis & Planning :→ 1> Gather business requirements.
2> Identify hardware/Software needs.
3> Define Project Scope and objectives.
4> Risk assessment and feasibility study.

[B] System Design & Architecture :→ 1> Database design (customer records, transactions).
2> UI/UX design for banking interface.
3> Define Security and encryption standards.
4> Develop System workflow and backend architecture.

[C] Software Development & Integration :→ 1> Develop core banking Software (accounts, Loans).
2> Implement ATM, internet banking, and mobile banking systems.
3> Integrate with third-party financial services (UPI).
4> Develop reporting and audit modules.

[D] Hardware & Infrastructure Setup :→ 1> Install Servers and network infrastructure.
2> Setup branch computers and workstations.
3> Implement cybersecurity measures (firewalls).
4> Ensure disaster recovery setup (backup, failover systems).

[E] Testing & Quality Assurance :→ 1> Perform Unit testing, integration testing, System testing.
2> Security testing (fraud detection, encryption Validation).
3> Load and Performance testing.
4> Fixing bugs and optimizing Performance.

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[f] Training & Deployment → 1. Employee training sessions (bank staff, IT team).
2. Conduct user acceptance testing (UAT).
3. Deploy system in a controlled environment.
4. Full-scale deployment and go-live.

[g] Maintenance & Support → 1. Continuous system monitoring.
2. Implement software updates and patches.
3. Helpdesk and technical support.
4. Performance analysis and optimization.

→ (ii) Responsibility Matrix for the Project :- A Responsibility Assignment Matrix (RAM), also known as a RACI matrix, defines roles and responsibilities of team members for various tasks. Responsibility Key :-

(a) R (Responsible) → Performs the task.
(b) A (Accountable) → Approves the work, ensures completion.
(c) C (Consulted) → Provides input, expert guidance.
(d) I (Informed) → Needs updates but not actively involved.

Task	Project Manager	Business Analyst	Developers	IT Security Team	Testers	Bank Staff
Requirement Gathering	A	R	C	I	I	C
System Design	A	C	R	C	I	I
Software Development	I	I	R	C	I	I
Security Implementation	I	I	C	R	I	I
Testing & QA	I	C	C	R	R	I
Deployment	A	C	R	R	C	I
Training & Support.	A	R	C	C	I	R

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• Q.5> Explain Software Configuration Management in detail.

ANS → i> Software Configuration Management (SCM) is the process of managing Software changes systematically.

ii> It ensures Consistency, traceability, and Collaboration in Software development.

iii> Key activities :> Configuration Identification, change Control, Auditing, Build & Release Management.

iv> Tools and Techniques :> (a) Version Control Systems (VCS) :- Git, SVN, Mercurial.
(b) Branching & Merging :- Git Flow, Feature Branching.
(c) Build & Release Management :- Jenkins, GitHub Actions.
(d) Infrastructure as Code (IaC) :- Ansible, Puppet, Chef.
(e) Issue Tracking :- Jira, Trello.

v> Benefits :>
(a) Improves team Collaboration.
(b) Reduces Errors and enhances Security.
(c) Enables faster development and automated testing.
(d) Ensures Compliance and Regulatory tracking.

vi> Limitations :>
(a) Requires training and expertise.
(b) Can be Complex for small projects.
(c) Risk of merge conflicts in large teams.

vii> SCM is widely used in Software development, DevOps, and IT operations to manage code changes, automate builds, and track Software versions.

viii> It ensures Smooth Collaboration in large teams by allowing multiple developers to work on same Project without conflicts.

ix> It is also essential in regulated industries like healthcare and finance, where audit trials and compliance are critical.

x> Ex :- In Linux Kernel development, thousands of developers use Git and GitHub to manage code changes, track versions, and merge updates efficiently. This ensures stable releases while allowing parallel development and Collaboration.

P.T.O.

Q.6> Explain the Significance of Gantt-charts in Project management.

Ans→ i> A Gantt-Chart is a Visual Project management tool that displays tasks, their durations, dependencies, and Progress over time using a bar chart format.

ii> It plays a crucial role in Planning, Scheduling, and tracking Project activities.

iii> Key Significance :→ <1> Visual Representation of Project Timeline :- Displays tasks, durations, and deadlines in a bar chart format for better clarity.

<2> Task Scheduling & Dependencies :- Helps in organizing tasks in correct sequence and identifying dependencies to avoid delays.

<3> Resource Allocation & Workload Management :- Ensures optimal use of resources by preventing overallocation or underutilization.

<4> Tracking Progress & Milestones :- Allows monitoring of task completion status and achieving key project milestones on time.

<5> Improves Communication & Coordination :- Acts as a common reference for teams and stakeholders to enhance collaboration.

<6> Risk Identification & Mitigation :- Helps in spotting potential bottlenecks early and making adjustments to keep the project on track.

iv> Benefits of Gantt-Chart :→ (a) Provides a clear picture of entire project.
(b) Helps track deadlines and avoid delays.
(c) Ensures all team members stay informed.
(d) Flexible and Adaptable.

v> Limitations of Gantt-Chart :→ (a) Can become cluttered with too many tasks.
(b) Time-Consuming to Update
(c) Shows what needs to be done but not How.
(d) Changes in one task can impact multiple other tasks.

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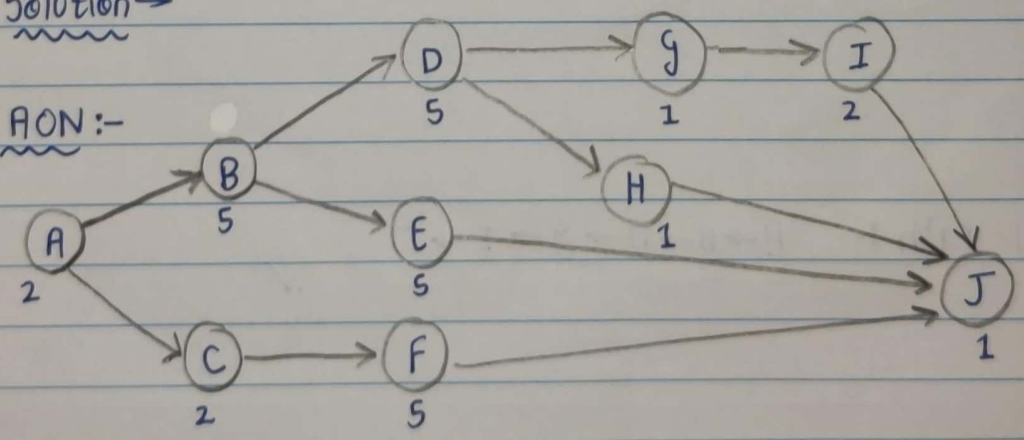
• Q.7→ Draw the AON & AOA network diagram for following Project & Show Critical Path.

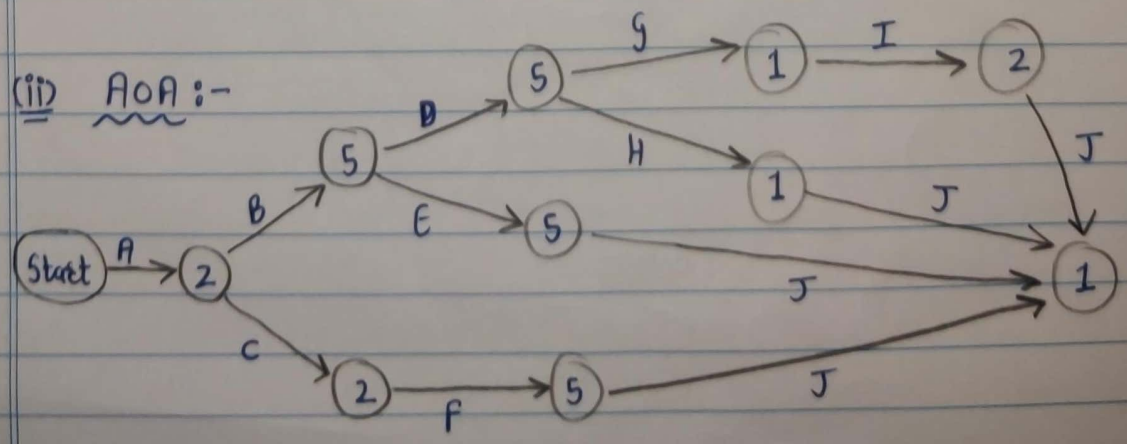
Activity	Time	Immediate Predecessor
A	2	—
B	5	A
C	2	A
D	5	B
E	5	B
F	5	C
G	1	D
H	1	D
I	2	G
J	1	E, F, H, I

ANS→ Solution→

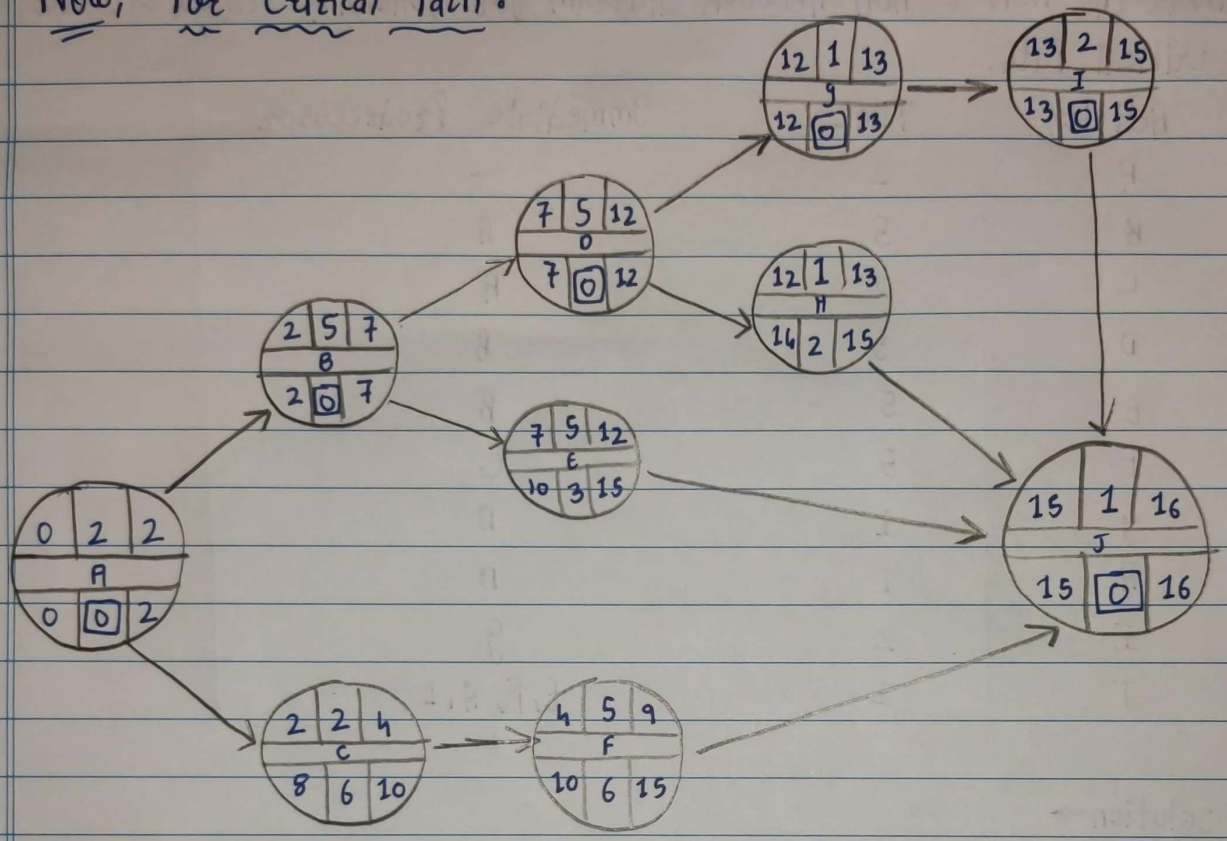
(i) AON :-



(ii) AOA :-



Now; For Critical Path :-



∴ Critical Path :- A → B → D → G → I → J //