

B. E. PRODUCTION ENGINEERING FOURTH YEAR SECOND SEMESTER EXAM – 2025**Subject: PLANNING & EVALUATION OF PROJECTS (HONS.)****Time: Three Hours****Full Marks: 100**

Q1. a) Briefly explain the project life cycle.

b) Discuss the characteristics of a project organization. 4+4M

Q2. What are the different costs associated with project works? Discuss how the duration of a project can be reduced with minimum increase in the cost of the project. 7M

Q3. Briefly explain i) project constraints & ii) project environment. 8M

Q4. What is meant by 'IRR' of a project? How it is utilized in evaluating project proposals? 7M

Q5. Make a comparative appraisal of I) PERT & CPM and II) Float & Slack. 8M

Q6. Identify and explain the factors that make a project to be of high risk. Explain how project risks can be quantified. 7M

Q7. Consider the following network for a small maintenance project (all times are in days; network proceeds from node 1 to node 7):

Job activity	Network		Optimistic time (Days)	Pessimistic time (Days)	Most Likely (Days)
	Initial node	Final Node			
A	1	2	1	3	2
B	1	4	4	6	5
C	1	3	4	6	5
D	2	6	2	4	3
E	2	4	1	3	2
F	3	4	2	4	3
G	3	5	7	15	9
H	4	6	4	6	5
I	4	7	6	14	10
J	4	5	1	3	2
K	5	7	2	4	3
L	6	7	6	14	10

a. Draw an arrow diagram representing the project.

b. What is the critical path and associated time?

c. What is the total slack time in the network?

d. What is the expected time for 68, 95, and 99 percent completion limits?

e. If activity G had an estimated time of fifteen days, what impact would this have on your answer to part b?

10M

Q8. (a) As a project manager overseeing the launch of a new e-scooter, use an Ishikawa (Fishbone) diagram to analyze the problems involved in the product launch. Indicate what you believe to be the most significant factor influencing the decision-making process. 7M

(b) Discuss the role of decision -support systems such as Artificial intelligence and mathematical models

3M

[Turn over

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Q9. (a) When to bring the project manager on board has always been a problem. For each of the following situations, identify the advantages and disadvantages.

a. The project manager is brought on board at the beginning of the conceptual phase but acts only as an observer. The project manager neither answers questions nor provides his ideas until the brainstorming session is completed. 5M

b. When brainstorming is completed during the conceptual phase, senior management appoints one of the brainstorming team members to serve as the project manager.

(b) You have been asked to develop a work breakdown structure for a project. How should you go about accomplishing this? Should the WBS be time-phased, department-phased, division-phased, or some combination? 5M

Q14.(a) Sales forecasts indicate that a minimum of 5000 units will be sold each year for next three years. Two design modifications are being considered for the product. One modification will increase fixed costs by \$30,000 per year, but it will reduce the variable cost by \$8 per unit. The other modifications will increase the fixed cost by \$ 7000 and reduce the variable cost by \$6 per unit. Variable cost is currently \$30 per unit.

(i) which design modification should be adopted?

(ii) At what point would you be indifferent to the two alternatives? 5M

(b) Define and explain the following: i) Critical activity, ii) Dummy activity, iii) advantages of Network techniques over 'Gantt Chart' methods 5M

Q10. From the given payoff table, the element of which represent 'Profit', determine the best decision alternative using i) Savage principle & ii) Hurwicz principle 7M

Decision Alternatives	Chance Event				
	Event 1	Event 2	Event 3	Event 4	Event 5
D1	100	105	95	80	90
D2	90	88	80	75	70
D3	85	90	100	85	75
D4	80	80	75	90	85
D5	70	85	85	95	80

Q11. Select the best plan from the given data of different proposals of a project: by using NPV as the selection criteria. Suitable rate of discount may be assumed with proper justification. 8M

Proposed Plan	Investment (Rs. in Cr.)	Returns in Rs. in Cr.			
		After 1 st year	After 2 nd year	After 3 rd year	After 4 th year
1	13.50	3.50	3.50	5.5	3.00
2	11.00	2.00	3.50	5.25	4.25
3	14.00	3.00	5.50	3.5	3.00

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Q12. Activities and the labour requirement of a Project are given in the following table:

Activity	Immediate Predecessor	Duration (Days)	No. of Workers
A	--	10	16
B	--	9	14
C	--	13	10
D	A,B,C	14	9
E	A	10	14
F	C	9	15
G	E	12	9
H	E	13	12
I	D,F,H,	8	8
J	E	10	16
K	G, J	11	13

Evaluate the day wise labour requirement for the project and draw the histogram for manpower loading. Carryout smoothing exercise to bring down the peak Manpower requirement and determine the total idle man days, if the peak labour requirement is hired for the total duration of the project. 20M

Q13. From the given data of a manufacturing project evaluate: i) the minimum duration & cost of the project & ii) project duration at minimum total cost. Indirect cost is Rs.1200 per day. Draw the project duration vs total cost graph. 20M

Activity	Immediate Predecessor	Duration (Days) Normal	Duration (Days) Crash	Direct Cost (Rs.) Normal	Direct Cost (Rs.) Crash
A	--	16	14	14500	16300
B	--	13	12	1700	2400
C	A	22	20	8500	10500
D	A,B	18	16	4500	5000
E	A,B	14	13	4000	4950
F	C	13	11	2500	4100
G	D,F	16	15	5000	5900
H	G,E	17	16	1200	1620