MAY 2025 **P/ID 77931/RMB2G**

Time : Three hours Maximum : 80 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. What do you understand by a model?

2. List out any two applications of Linear Programming Problem.

3. What are the methods available to find out feasible solutions in Transportation problem?

4. What is critical path?

5. State the advantages of Hungarian Method in Assignment problem.

6. How do you define a crashing of network?

7. Define Total Float.

8. Write down any two applications of queuing theory.

9. What is simulation?

10. Define Law of Dominance.

11. Explain Saddle point.

12. What is pure strategy?

PART B — (5 × 6 = 30 marks)

Answer any FIVE questions.

13. Elaborate on the characteristics of Operations Research.

14. Using the Graphical method, solve the following LPP

Minimize $Z = 20x_1 + 10x_2$

subject to

$x_1 + 2x_2 \leq 40$

$3x_1 + x_2 \geq 30$

$4x_1 + 3x_2 \geq 60$

where $x_1, x_2 \leq 0$

15. Obtain the basic feasible solution to the transportation problem through North West Corner Method

		Warehouse				Capacity
		W1	W2	W3	W4	
Factory	F1	19	30	50	10	7
	F2	70	30	40	60	9
	F3	40	8	70	20	18
Required		5	8	7	14	

16. Enumerate the steps in solving an assignment problem in Hungarian Method.

17. State and discuss the methods employed for solving an sequencing problem.

18. The following table gives the activities of a construction project and duration (in days). Draw the network diagram and find the critical path.

Activity :	1-2	1-3	2-3	2-4	3-4	4-5
Duration :	20	25	10	12	6	10

19. Discuss about the applications of queuing theory in management decision making.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. For the following transportation problem, find out the optimal Solution. Unit cost of transportation in rupees, demand and supply are given in the table. Use Least-cost method for obtaining feasible solution.

		Destination				Supply
		D1	D2	D3	D4	
Source	S1	10	13	11	8	65
	S2	9	12	12	10	44
	S3	13	9	11	9	41
Demand		60	40	55	45	

21. Describe the application and Scope of operations research.

22. (a) Using graphical method, solve the game whose payoff matrix is $\begin{vmatrix} 2 & 4 & -2 & 8 \\ 3 & 6 & 5 & 5 \end{vmatrix}$.

(b) A truck is priced at Rs. 60,000 and the running costs are estimated at Rs. 6,000 for each of the first 4 years, increasing by Rs. 2,000 per year in the subsequent years. If money is worth 10% per year, when the truck should be replaced with a new one? Assume that the resale price of the truck is negligible.

23. Trains arrive at a yard at the rate of 3 per hour. The yard can accommodate only 4 trains. The service time per train is 36 minutes. Find

(a) The probability that the yard is empty

(b) Average number of trains in the yard

(c) Average waiting time for a train in the yard

24. A project has the following characteristics :

Activity	Duration	Preceding activity
A	6	–
B	8	A
C	4	A
D	9	B
E	2	C
F	7	D

Construct the network and compute LST, LFT, EST, EFT and determine the critical path and the project duration.
