MAY 2024 **P/ID 77931/RMB2G**

Time : Three hours Maximum : 80 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions in 50 words each.

1. What is degeneracy in LPP?
2. State the methods available to find out feasible solutions and optimal solution in Transportation problem?
3. What do you understand by unboundedness?
4. Explain infeasibility solution with example.
5. Discuss two-person zero-sum game.
6. With examples, explain about project.
7. What is individual replacement policy and group replacement policy?
8. Write the assumptions made to solve the sequencing problems.
9. State the concept of interfering float and independent float.
10. What is payoff matrix?
11. Explain about Inventory Control.
12. What is simulation?

PART B — ($5 \times 6 = 30$ marks)

Answer any FIVE questions in 250 words each.

13. Discuss the usefulness of operations research to a factory manager.

14. Using graphical method, obtain the values of x_1 and x_2:

Minimize $Z = 5x_1 + 4x_2$

Subject to

$4x_1 + x_2 \geq 40$

$2x_1 + 2x_2 \geq 90$

where $x_1, x_2 \geq 0$

15. Discuss selective inventory control techniques with appropriate examples.

16. Explain the procedure in solving assignment problems using Hungarian method.

17. Find the sequence that minimizes the total elapsed time required to complete the following tasks on machine M1 and M2, in the order M1, M2. Also find the minimum total elapsed time.

Task :	A	B	C	D	E	F	G	H	I
M1 :	2	5	4	9	6	8	7	5	4
M2 :	6	8	7	4	3	9	3	8	11

18. Discuss the applications of quantitative methods in production planning.

19. Payoff matrix for player A is given below. Determine the optimum strategies for both the players and obtain the value of the game :

		Player B			
		B1	B2	B3	B4
Player A	A1	3	2	4	0
	A2	3	4	2	4
	A3	4	2	4	0
	A4	0	4	0	8

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions in 500 words each.

20. ABC & Co. has three open hearth furnaces and four rolling mills. The capacities of the furnaces are 20, 60 and 70 quintals respectively. The requirements at the different rolling mills are 30, 30, 40 and 50 quintals respectively. Transportation cost (Rs. Per quintal) for shipping steel from furnaces to rolling mills are shown in the following table. What is the optimal shipping cost?

		Mills			
		M1	M2	M3	M4
Furnaces	F1	3	1	5	10
	F2	7	4	2	3
	F3	8	8	5	2

21. Discuss the different phases of operations research, and explain its characteristics.

22. Solve the following game :

		Player B			
		b_1	b_2	b_3	b_4
Player A	a_1	35	65	25	5
	a_2	30	20	15	0
	a_3	40	50	0	10
	a_4	55	60	10	15

23. Given the following project characteristics, construct the network and compute T_E, T_L for each and find the critical path and project duration.

Activity	Predecessors	Duration (days)
A	1 – 2	2
B	1 – 3	7
C	1 – 4	8
D	2 – 5	3
E	3 – 5	6
F	3 – 6	10
G	3 – 7	4
H	4 – 6	6
I	5 – 7	2
J	6 – 8	5
K	7 – 8	6

24. A machine costs Rs. 6000. The running cost and salvage value at the end of the year is given below If the interest rate is 10% per year, find when the machine is to be replaced.

Year :	1	2	3	4	5	6	7
Running cost (Rs.) :	1200	1400	1600	1800	2000	2400	3000
Salvage value (Rs.)	4000	2666	2000	1500	1000	600	600