(6 pages)

DECEMBER 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 do you mean by model?

2. State the limitations of linear LPP.

3. Define the term 'transportation'.

4. What is degeneracy in Transportation Problem?

5. What is a project? Give examples.

6. What is dummy activity? When it is needed in network diagram?

7. Mention the condition that redundancy occurs in network diagram.

8. How do you estimate the average waiting time of a customer in the line?

9. Elicit any three situations where replacement is required in manufacturing industry.

10. Define SIRO in queuing theory.

11. Explain Saddle point.

12. What is EOQ?

PART B — ($5 \times 6 = 30$ marks)

Answer any FIVE questions in 250 words each.

13. Elaborate on the origin of operations research.

14. With the help of graphical method, find the values of x_1 and x_2.

Minimize $Z = 20x_1 - 10$,

subject to $x_1 + 2x_2 \leq 40$,

$$3x_1 + x_2 \geq 30$$

$$4x_1 + 3x_2 \geq 60$$

where $x_1, x_2 \geq 0$.

15. Enumerate the steps involved in solving a assignment problem.

16. What are the methods available to find out feasible solution in transportation problem? Explain any one method with example.

17. Solve the following assignment problem.

Worker	Job			
	A	B	C	D
1	45	40	51	67
2	57	42	63	55
3	49	52	48	64
4	41	45	60	55

18. In critical path method, explain the normal schedule and crash schedule of a project.

19. Draw the network for the given data and find the critical path.

Activity	A	B	C	D	E
Predecessor Activities	-	-	A,B	B	A
Duration	2	3	4	1	5
Activity	F	G	H	I	J
Predecessor Activities	C	E,F	D,F	G,H	I
Duration	3	2	7	6	3

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions in 500 words each.

20. Solve the following LPP using simple method

Maximize $z = 80x_1 + 90x_2$.

Subject to $2x_1 + 3x_2 \leq 1500$

$3x_1 + 2x_2 \leq 1500$

$x_1 \leq 450$

where $x_1, x_2 \geq 0$.

21. Give a detailed discussion on the application of quantitative methods in marketing, production planning and purchasing with suitable examples.

22. Solve the following transportation problem to determine the optimal allocation for maximum profit.

		Market Zone (Unit profit (Rs./unit)				Warehouse availability (unit)
Warehouse		A	B	C	D	
	X	12	18	6	25	200
	Y	8	7	10	18	500
	Z	14	3	11	20	300
	Demand (Units)	180	320	100	400	

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. Use dominance property and solve the following game

		Players B				
		B1	B2	B3	B4	B5
	A1	2	4	3	8	4
Player A	A2	5	6	3	7	8
	A3	6	7	9	8	7
	A4	4	2	8	4	3

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