MAY 2022 **U/ID 32519/UEM6A**

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. Write the mathematical formulation of LPP.
2. Write any two advantages of LPP.
3. Define slack variable.
4. Write the steps involved in least cost method.
5. What do you mean by unbalanced transportation problem?
6. Define Assignment Problem.
7. Define the term : Total elapsed time in sequencing.
8. Define Maximin Principle in game theory.
9. What do you mean queue disciple?
10. For the M/M/1 queue write the formula for idle probability.
11. Define the term burst event in network analysis.
12. Define the term predecessor activity in network analysis.

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. Old hens can be bought at Rs. 2 each and young ones at Rs. 5 each. The old hens lay 3 eggs per week and young ones lay 5 eggs per week, each egg being worth 30 paise. A hen costs Rs. 1 per week to feed. A person has only Rs. 80 to spend for hens. How many of each kind showed he buy to give a profit of more than Rs. 6 per week, assuming that he can not have more than 20 hens? Formulate this as a LPP.

14. Using graphical method solve

Maximize $Z = 5x_1 + 8x_2$

Subject to

$$15x_1 + 10x_2 \leq 180$$

$$10x_1 + 20x_2 \leq 200$$

$$15x_1 + 20x_2 \leq 210$$

and $x_1, x_2 \geq 0$.

15. Write the steps in Vogel's Approximation Method.

16. Solve the assignment problem.

		Programmes			
		A	B	C	D
Programmers	1	120	100	80	90
	2	80	90	110	70
	3	110	140	120	100
	4	90	90	80	90

Assign the programmers to the programmes in such a way that the total computer time is minimum.

17. Write the general assumptions in sequencing problem.

18. Discuss M/M/S model.

19. Write the advantages and drawbacks of CPM.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. Solve using Simplex Algorithm.

Maximize $Z = 7x_1 + 5x_2$

Subject to

$$x_1 + 2x_2 \leq 6$$
$$4x_1 + 3x_2 \leq 12$$
$$x_1, x_2 \geq 0 .$$

21. Obtain an initial basic feasible solution to the following transportation problem using North-West Corner Rule.

	D_1	D_2	D_3	D_4		
O_1	6	4	1	5	14	
O_2	8	9	2	7	16	Availability
O_3	4	3	6	2	5	
	6	10	15	14		

Requirement

22. Find the optimal strategies of A and B and value of game using principle of dominance.

		Player B			
		B_1	B_2	B_3	B_4
Player A	A_1	7	6	8	9
	A_2	–4	–3	9	10
	A_3	3	0	4	2
	A_4	10	5	–2	0

23. Discuss M/M/1 queue.

24. A small assembly plant assembles PC's through 9 interlinked stages according to adjoining precedence/process.

Stage From to	Duration Hours
1-2	2
1-3	2
1-4	1
2-5	4
3-6	8
3-7	5
4-6	3
5-8	1
6-9	5
7-8	4
8-9	3

(a) Draw a network.

(b) Find the critical path and assembly duration.