DECEMBER 2023 **U/ID 32519/UEM6A**

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions

1. What is operations Research?

2. Define Slack variable

3. State duality theory.

4. Define optimal solution.

5. State the any three methods to find the initial basic feasible solution of transportation problem.

6. Which method is used to solve Assignment problem.

7. Define total elapsed time.

8. What is no passing rule?

9. Define Queueing theory?

10. Write minimum cost service time.

11. Expand CPM.

12. What is the value of fair game?

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions

13. Solve the top following L.P.P by graphical method.

Minimize $z = 20x + 10y$, Subject to $x + 2y \leq 40$, $3x + y \geq 30$, $4x + 3y \geq 60, x, y \geq 0$.

14. Write procedure for simplex method.

15. Write Assignment Algorithm.

16. Find the sequences the minimizes the total elapsed time, required to complete the following jobs on two machines M_1 and M_2 in the order $M_1 \rightarrow M_2$.

Job	A	B	C	D	E
M_1	5	1	9	3	10
M_2	2	6	7	8	4

Find the idle line

17. Explain the elements of Queueing model.

18. State the main differences between PERT and CPM.

19. How do you construct a network? Explain.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions

20. Solve Minimize $z = 2y_1 + 3y_2$, subject to constraints $y_1 + y_2 \geq 5$, $y_1 + 2y_2 \geq 6$ $y_1, y_2 \geq 0$ by Big - M method.

21. Find the optimum solution to the following transportation problem in which the cells contain the transportation cost in rupees.

	W1	W2	W3	W4	W5	
F1	7	6	4	5	9	40
F2	8	5	6	7	8	30
F3	6	8	9	6	5	20
F4	5	7	7	8	6	10
	30	30	15	20	5	

22. Find the total elapsed time

Job	1	2	3	4	5	6
M_A	20	30	15	18	33	8
M_B	16	11	30	35	16	12
M_C	6	40	13	22	25	17

23. Explain $(M/M/1)$; $(\infty/FIFO)$ model.

24. A project scheduling has the following characteristics.

Activity	1-2	1-3	2-4	3-4	3-5	4-9
Time (days)	4	1	1	1	6	5
Activity	5-6	5-7	6-8	7-8	8-10	9-10
Time (days)	4	8	1	2	5	7

Summarize the CPM calculations in a Tabular form and determine the critical paths.