(6 pages)

APRIL 2023 **72246/BB34A**

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. What are the limitations of Linear programming problem?

2. Define artificial variables.

3. State any two functions of operation research.

4. Define degeneracy in transportation problem.

5. Express an assignment problem in terms of Linear programming problem.

6. Define a network and give an example.

7. What is meant by critical path?

8. What is dummy activity and when is it needed?

9. What is meant by single channel queueing system?

10. What is queueing theory?

11. Distinguish between pure and mixed strategies.

12. State dominance rule for row and column.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. List out the applications of Linear Programming problem.

14. Explain the graphical method for maximising a Linear programming Problem.

15. Find the Initial basic feasible solution for the following transportation problem by vogel's approximation method.

		Destination				
		D1	D2	D3	D4	Supply
	O1	11	13	17	14	250
Origin	O2	16	18	14	10	300
	O3	21	24	13	10	400
	Demand	200	225	275	250	950

II BBA → Operation Research

16. How would you solve an assignment problem using Hungarian method?

17. Construct a network for each of the protects whose activities and their precedence relationships are given below

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor	–	–	A	A	I,J,K	B,D	B,D	F	A	G,H	F

18. Describe the basic characteristics of Queueing problem.

19. Explain the algebraic method of solving a rectangular game.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. Discuss the various classification schemes of models in operation research.

21. Solve the following assignment problem in order to minimize the total cost. The cost matrix given below gives the assignment cost when different operators are assigned to various machines.

		Operators				
		I	II	III	IV	V
	A	30	25	33	35	36
	B	23	29	38	23	26
Machines	C	30	27	22	22	22
	D	25	31	29	27	32
	E	27	29	30	24	32

22. Explain the procedure of determining the critical path, total float and independent float in a network diagram.

23. Customers arrive at a one window drive in bank according to poisson distribution with mean 10 per hour. Service time per customer is exponential with mean 5 minutes. The space in front of the window including that for the serviced car can accommodate a maximum at 3 cars. Others can wait outside this space.

(a) What is the probability that an arriving customer can drive directly to the space in front of the window?

(b) What is the probability that an arriving customer will have to wait outside the indicated space?

(c) How long is arriving customer expected to wait before starting service?

24. Solve the following 6×2 game graphically

$$\text{Player A} \begin{matrix} \\ \\ \\ \\ \\ \\ \end{matrix} \begin{matrix} \text{Player B} \\ \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 6 \\ 4 & 1 \\ 2 & 2 \\ -5 & 0 \end{bmatrix} \end{matrix}$$