

## **MBAC 2004**

M.B.A. DEGREE EXAMINATION, JANUARY 2021.

Second Semester

General (Common)

OPERATIONS RESEARCH AND MANAGEMENT

Time : Three hours

Maximum : 100 marks

PART A — (5 × 6 = 30 marks)

Answer any FIVE questions.

1. Explain the functions of operations management, in detail.
2. Discuss the principles of Plant layout Designing.
3. Describe briefly the application of operation research in managerial decision making.
4. Write the dual to the following problem:

Maximize  $Z = x_1 - x_2 + 3x_3$

Subject to constraints

$$x_1 + x_2 + x_3 \leq 10$$

$$2x_1 - 0x_2 - x_3 \leq 2$$

$$2x_1 - 2x_2 - 3x_3 \leq 6$$

$$x_1, x_2, x_3 \geq 0$$

5. Elaborate the various costs associated with inventory management.
6. Explain the Importance of inventory management in the modern business context.
7. Distinguish between PERT and CPM.
8. Solve the following game:

		Player B	
		$B_1$	$B_2$
Player A	$A_1$	5	1
	$A_2$	3	4

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Discuss the various factors that are to be considered while selecting a plant site.
10. Compare and contrast the different types of plant layout.

11. Solve the following LPP by graphical method.

$$\text{Maximize } Z=9x_1+3x_2$$

Subject to constraints

$$5x_1+2x_2\leq 20$$

$$x_1\geq 3$$

$$x_2\leq 5$$

$$x_1, x_2\geq 0.$$

12. Briefly describe the advantages and limitations of operations research.

13. Find the optimal solution for the following transportation problem.

Shop	Warehouse					Supply
	I	II	III	IV	V	
A	20	18	18	21	19	100
B	21	22	23	20	24	125
C	18	19	21	18	19	175
Demand	60	80	85	105	70	

14. Solve the following assignment model.

	Men			
Tasks	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

15. A project consists of eight activities with the following relevant information:

Activity	Immediate Predecessor	Estimated duration (days)		
		Optimistic	Most likely	Pessimistic
A	–	1	1	7
B	–	1	4	7
C	–	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D,E	3	6	15
H	F,G	1	2	3

Draw the PERT network and find out the expected project completion time.

16. A road transport company has one reservation clerk on duty at a time. Customers arrive at a rate of 8 per hour and the clerk can service 12 customers on an average per hour. Find out.
- (a) System efficiency.
  - (b) Average waiting time in the queue.
  - (c) Average waiting time in the system
  - (d) Average no.of customers waiting for service in the system.
  - (e) Average no.of customers waiting for service in the queue.

PART C — (1 × 20 = 20 marks)

Compulsory

17. Use simplex method to solve the following LPP.

$$\text{Maximize } Z = 3x_1 + 5x_2 + 4x_3$$

Subject to the constraints

$$2x_1 + 3x_2 \leq 8$$

$$2x_2 + 5x_3 \leq 10$$

$$3x_1 + 2x_2 + 4x_3 \leq 15$$

$$x_1, x_2, x_3 \geq 0$$

---