

SECTION - B

UNIT - I

12623

**MBA 2 Yr. 3rd Sem. New Scheme 2019-20
Examination - March, 2021**

OPERATIONS RESEARCH

Paper : 20IMG23C3

Time : Three Hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt compulsory question No. 1 from Section-A and four questions from Section-B (one from each Unit). All questions carry equal marks.

SECTION - A

- 1. (a) Explain assumptions of LPP. 2 × 8 = 16
- (b) What is the relation between Saddle Point and pure strategies ?
- (c) Explain Laplace Principle.
- (d) Discuss assumptions of Multichannel queuing model.
- (e) Explain Time-Lost trade off.
- (f) Explain Floats in Network diagram.
- (g) What are artificial variables ?
- (h) What is Bayesian Analysis in decision theory ?

2300-(P-4)(Q-9)(21)

P. T. Q.

- 2. A company manufactures two kinds machines, each requiring a different manufacturing technique. The deluxe machine requires 18 hrs of labour, 8 hrs of testing and yield a profit of Rs. 400. The Standard machine requires 3 hrs of Labour, 4 hrs of testing and yields a profit of Rs. 200. There are 800 hrs of labour and 600 hrs of testing available each month. A marketing forecast has shown that the monthly demand for the standard machine is to be more than 150. The management wants to know the number of each model to be produced monthly that would maximize total profit. Formulate and solve this as a linear programming problem. 16

- 3. Solve the following LPP 16

Max Z = 3x₁ + 5x₂ + 4x₃

s.t.

2x₁ + 3x₂ = 8

2x₂ + 5x₃ ≤ 10

3x₁ + 2x₂ + 4x₃ ≤ 15

UNIT - II

- 4. Find the optimum solution for the following Transportation Problem Project Location : 16

	A	B	C	D	
Pit W	4	8	8	5	76
X	16	24	16	6	82
Y	8	16	24	9	77
	70	100	45	10	

12623-2300-(P-4)(Q-9)(21) (2)

5. A company is considering expanding into five new sales territories. The company has recruited four new salesmen. Based on the salesmen's experience and personality traits, the sales manager has assigned ratings to each of the sales manager has assigned ratings to each of the salesmen for each of the sales territories. The range are as follows : 16

		Territory				
		T ₁	T ₂	T ₃	T ₄	T ₅
Sales	S ₁	75	80	85	70	90
	S ₂	91	71	82	75	85
	S ₃	78	90	85	80	80
	S ₄	65	75	88	85	90

Suggest optimal assignment of the salesmen. If for certain reasons, salesman 'D' can't be assigned to territory 3, will the optimal assignment be different? If so, what would be the new assignment schedule?

UNIT - III

6. A glass factory that specializes in developing a substantial backlog and for this the firm's management in considering three courses of action. To arrange for subcontracting (S₁), to begin over time production (S₂), and to construct new facilities (S₃). The correct choice depends largely upon the future demand, which may be low, medium or-high. By consensus, management ranks the respective probabilities as 0.10, 0.50 & 0.40. A cost analysis reveals the effect upon the profits. This is shown in the table below : 16

		Course of Action		
Demand	Prob.	S ₁	S ₂	S ₃
Low	0.10	10	-20	-150
Medium	0.50	50	60	20
High	0.40	50	100	200

7. A project schedule has the following characteristics : 16

Activity :	1-2	1-3	1-4	3-4	2-5	2-6
Duration	6	2	13	10	4	9
Activity :	2-7	5-6	7-8	6-9	8-10	9-10
Duration	2	7	4	3	10	5

- (a) Draw Network Diagram and find Critical Path.
(b) Calculate time estimates and loads.

UNIT - IV

8. A supermarket has two sales girls at the sales counters. If the service time for each customer is exponential with a mean of 4 mins, and if the people arrive in Poisson fashion at and if the people arrive in Poisson fashion at the rate of 10 an hour, then calculate following : 16
- (a) Probability that a customer has to wait for being served.
(b) Expected percentage of idle time for each sales girl.
(c) If a customer has to wait, what is the expected length of his waiting time?
9. What is simulation? Explain Monte Carlo Method with the help of example. 16