

Total No. of Questions : 07]

[Total No. of Pages : 03

MBA (Sem. - 3rd)
APPLIED OPERATIONS RESEARCH
SUBJECT CODE : MB - 301
Paper ID : [C0111]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.

Section - A

(10 × 2 = 20)

Q1) Explain briefly the following terms/Methods in the context of Operations Research.

- a) Operations Research.
- b) Sensitivity analysis.
- c) Degeneracy in transportation model.
- d) VAM.
- e) EOQ.
- f) Dominance Principle.
- g) Hurwitz decision criterion.
- h) M/M/I Model.
- i) Dynamic Programming.
- j) Duality Theorem.

Section - B

(4 × 10 = 40)

Q2) (a) Solve the following by graphical method.

Maximize $z = 3x + 2y$ subject to
 $-2x + 3y \leq 9$
 $x - 5y \geq -20$
 $x, y \geq 0.$

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P.T.O.

(b) Write the dual of the following LPP

$$\begin{aligned} \text{Max. } z &= 4x_1 + 2x_2 \text{ subject to} \\ x_1 - 2x_2 &\geq 2 \\ x_1 + 2x_2 &= 8 \\ x_1 - x_2 &\leq 10 \\ x_1 &\geq 0, x_2 \text{ unrestricted in sign.} \end{aligned}$$

Q3) Solve the following transportation problem and interpret the result.

		Market				
		1	2	3	4	Supply
Ware-house	A	5	2	4	3	22
	B	4	8	1	6	15
	C	4	6	7	5	8
Requirement		7	12	17	9	

Q4) The management of a large hotel is considering periodic replacement of the light bulbs fitted in its rooms. There are 500 rooms in the hotel and each room has 6 bulbs. The management is now following the policy of replacing the bulbs as they fail at a cost of Rs. 3 per bulb. The management feels that this cost can be reduced to Rs. 1 by adopting the periodic replacement method. On the basis of information given below evaluate the alternatives and make a recommendation to the management.

Month of use :	1	2	3	4	5
% of Bulb failing :	10	25	50	80	100
by that month.					

Q5) Draw the network diagram for the following activities and find the critical path and duration of the project.

Activities	:	A	B	C	D	E	F	G	H	I	J	K	L
Immediate Predecessor													
Activity	:	-	-	-	B, C	A	C	E	E	D, E, H	E	I, J	G
Duration (days)	:	9	4	7	8	7	9	10	8	6	9	10	7

Q6) (a) Solve the following two person zero sum game.

$$\begin{pmatrix} 1 & 7 & 3 & 4 \\ 5 & 6 & 4 & 5 \\ 7 & 2 & 0 & 3 \end{pmatrix}$$

- (b) What is inventory Management? Discuss various relevant costs associated with it with examples.

Q7) Write brief note on the following (Any Two) :

- (a) Decision Making under risk.
- (b) Queuing Models
- (c) Decision Tree Analysis.

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