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# MBA (Sem. - 3rd/4th)

## APPLIED OPERATION 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

*Q1)* *(10 x 2 = 20)*

a) Explain feasible region with example.

b) List some factors affecting the safety stock level.

c) What do you mean by Zero-sum game?

d) Difference between order and reorder point.

e) What do you mean by saddle point?

f) Explain strategy, mixed strategy in game theory.

g) Explain degeneracy in LPP.

h) Explain PERT and CPM.

i) Explain slack and surplus variable.

j) Explain Queuing theory and list its various models.

### Section - B

*(4 x 10 = 40)*

*Q2)* Solve graphically

Maximize $z = 16x_1 + 8x_2$

Subject to

$6x_1 + 4x_2 >= 24$

$4x_1 + 2x_2 <= 16$

$3.5\ x_1 + 3x_2 <= 21$

$x_1 >= 0$

$x_2 >= 0$

*Q3)* (a) List and explain application areas of LPP.

(b) "Dual of a dual is primal" explain this statement with an example.

*Q4)* Determine the optimal assignment schedule.

| | | Deficit cities | | | | |
|---|---|---|---|---|---|---|
| | | I | II | III | IV | V |
| | A | 16 | 13 | 17 | 19 | 20 |
| | B | 13 | 12 | 13 | 16 | 17 |
| Surplus | C | 14 | 11 | 15 | 17 | 18 |
| cities | D | 5 | 50 | 8 | 8 | 11 |
| | E | 5 | 35 | 7 | 8 | 10 |

*Q5)* (a) A company uses annually 48000 units of raw material costing Rs. 1.20 per unit. Placing each order costs Rs. 45 and inventory carrying cost are 15% per year of average inventory values. Find EOQ.

(b) What do you mean by ABC analysis? Explain it with example.

*Q6)* A company is spending Rs. 1,000 on transportation of its units from three plants to four distribution centers. The supply and demand of units, with unity cost of transportations are given as :

| | Distribution center | | | | |
|---|---|---|---|---|---|
| | DI | DII | DIII | DIV | Availability |
| P1 | 19 | 30 | 50 | 12 | 7 |
| P2 | 70 | 30 | 40 | 60 | 10 |
| P3 | 40 | 10 | 60 | 20 | 18 |
| Requirements | 5 | 8 | 7 | 15 | |

Solve it by VAM and NWCM.

*Q7)* (a) Explain decision making under risk.

(b) What do you mean by decision tree? Explain its advantages and disadvantages.