

## M.B.A.

**THEORY EXAMINATION (SEM-II) 2016-17**  
**QUANTITATIVE TECHNIQUES FOR MANAGERS**

Time : 3 Hours

Max. Marks : 70

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

## SECTION - A

1. Explain the following:

7 x 2 = 14

- (a) What is operations research?
- (b) What is the difference between decision making under risk and uncertainty?
- (c) What do you mean by balanced assignment problem?
- (d) Define transportation problem.
- (e) What is two person zero sum game?
- (f) Explain group replacement policy.
- (g) What is the importance of dummy activity in network diagram?

## SECTION - B

2. Attempt any five of the following questions:

5 x 7 = 35

- (a) Solve the following minimal assignment problem whose effectiveness matrix is as below:

		Job			
		I	II	III	IV
Man	A	2	35	4	5
	B	4	5	6	7
	C	7	8	9	8
	D	3	5	8	4

- (b) Find the optimal solution for transporting the products at a minimum cost for the following transportation problem with cost structures as follows:

To →				Availability
From ↓	P	Q	R	
A	16	19	12	14
B	22	13	19	16
C	14	28	8	12
Requirement	10	15	17	42

- (c) Solve the following L.P.P. by graphical method

$$\text{Max } z = 22x_1 + 18x_2$$

Subject to,

$$360x_1 + 240x_2 \leq 5760$$

$$x_1 + x_2 \leq 20. \quad \text{Where } x_1, x_2 \geq 0$$

- (d) Explain the maximin - minimax principle of game theory.

- (e) We have five jobs, each of which must go through the machines A, B and C in the order ABC.

Job i	1	2	3	4	5
Machine A (Ai)	5	7	6	9	5
Machine B (Bi)	2	1	4	5	3
Machine C (Ci)	3	7	5	6	7

Determine a sequence for the jobs that will minimize the total elapsed time. Also calculate the total elapsed time.

- (f) Solve the following game whose pay-off matrix is given by:

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	2	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

- (g) What is the waiting lime problem? Also discuss the assumption underlying common queuing models.
- (h) The maintenance cost and resale value per year of a machine whose purchase price is Rs. 7000 is given below.

Year	1	2	3	4	5	6	7	8
Operating Cost (Rs.)	900	1200	1600	2100	2800	3700	4700	5900
Resale Value (Rs.0	4000	2000	1200	600	500	400	400	400

When should the machine be replaced?

### SECTION - C

Attempt any two of the following questions:

2 x 10.5 = 21

3. Solve the following L.P.P.

$$\text{Max. } z = 5x_1 + 10x_2 + 8x_3$$

Subject to

$$3x_1 + 5x_2 + 2x_3 \leq 60$$

$$4x_1 + 4x_2 + 4x_3 \leq 72$$

$$2x_1 + 4x_2 + 5x_3 \leq 100$$

Where  $x_1, x_2, x_3 \geq 0$

4. If you make a unit product and it is sold you gain Rs. 5, if you make a unit and it is not sold you loose Rs. 3, suppose the probability distribution of the number of units demanded is as follows- *How many units should you make?*

No. of units demanded	1	2	3	4	5
Probability	0.20	0.25	0.30	0.05	0

5. Activity predecessor time estimate (in weeks) of a PERT network are as follow

Activity	Predecessor Activity	to	tm	tp
A	--	2	3	10
B	--	2	3	4
C	A	1	2	3
D	A	4	6	14
E	B	4	5	12
F	C	3	4	5
G	D, E	1	1	7

- (a) Draw the network and identify the critical path.
- (b) Calculate the variance and standard deviation of the project.