

M.B.A.

THEORY EXAMINATION (SEM-II) 2016-17

OPERATIONS RESEARCH

Time : 3 Hours

Max. Marks : 100

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

SECTION – A

1. Attempt the following questions:

10 x 2 = 20

- Discuss limitations of operations research.
- What is Graphical method in LPP?
- Define primal dual relationship?
- Define multiple optimal solution?
- What is two person zero sum game ?
- Define saddle point.
- Explain Replacement which fails gradually.
- What is total elapsed time in sequencing problem?
- Define queue length in M/MI model.
- What are critical activities in project?

SECTION – B

2. Attempt any five of the following questions:

5 x 10 = 50

- Define Operations research. State the different types of models used in operations research?
- The assignment cost of assigning any one operator to any one machine is given below.

		Operators			
		I	II	III	IV
Machine	A	10	5	13	15
	B	3	9	18	3
	C	10	7	3	2
	D	5	11	9	7

Find the optimal assignment.

- What is Assignment Problem? Discuss Hungarian Method of Assignment.
- Find the sequence that minimizes the total elapsed time (in hours) required to complete the following task

Task	:	A	B	C	D	E	F	G	H	I
Machine A :	2	5	4	9	6	8	7	5	4	
Machine B :	6	8	7	4	3	9	3	8	11	

- The cost of machine is Rs 61,000 and its scrap value is Rs 1,000. The maintenance costs found the past experiences are as follows:

Year	1	2	3	4	5	6	7	8
Maintenance Cost	1000	2500	4000	6000	9000	12000	16000	20000

When should the machine be replaced?

- Define Sequencing Problem? Describe the steps of Johnson algorithm of n jobs two machine?
- In a supermarket, the average arrival rate of customers is 10 every 30 minutes, following Poisson process. The average time taken by a cashier to list and calculate the

- customer's purchase is two and a half minutes following exponential distribution. What is the probability that the queue length exceeds six? What is the expected time spent by in the system?
- (h) What is project management? Differentiate between CPM and PERT techniques of project management.

SECTION – C

Attempt any two of the following questions:

2 x 15 = 30

- 3 Solve following LPP by simplex method

$$\text{Minimize } Z = 3x_1 + 2x_2$$

Subject to the constraints

$$4x_1 + 3x_2 \leq 12$$

$$4x_1 + x_2 \leq 8$$

$$4x_1 - x_2 \leq 18$$

$$x_1, x_2 \geq 0.$$

- 4 A company has three plants A,B and C, 3 warehouses X,Y and Z. the number of units available at the plants is 60,70,80 and the demand at X,Y,Z is 50,80,80 respectively. The unit cost of the transportation is given in the following table

	I	II	III
A	8	7	3
B	3	8	9
C	11	3	5

Find the allocation so that transportation cost is minimum.

- 5 The following table gives the activities and duration of a construction project.

Activity : 1-2 1-3 2-3 2-4 3-4 4-5

Duration (Days): 20 25 10 12 6 10

- Draw the network for the project
- Find the critical path
- Calculate all the floats.