Printed Pages : 2   **Roll No.** ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚   **NMBA025**

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**

    (a)   What is Decision making under risk?

    (b)   Define Payoff matrix.

    (c)   What is multiple optimal solution ?

    (d)   What is degeneracy in Transportation problem?

    (e)   What is unbalanced Assignment Problem?

    (f)   Define Game.

    (g)   What is Dominance Rule in Game theory?

    (h)   Define Jockeying in Queuing Theory.

    (i)   What is dummy activity?

    (j)   What is project crashing?

SECTION – B

2.   Attempt any five of the following questions: **5 x 10 = 50**

    (a)   Give definition of Operation Research. Discuss the scope and limitations of OR with suitable examples?

    (b)   Solve the following LPP.

Maximize $Z = 8000x_1 + 7000x_2$

subject to the constraints

$3x_1 + x_2 \leq 66$

$x_1 + x_2 \leq 45$

$x_1 \leq 20$

$x_2 \leq 40$

$x_1, x_2 \geq 0$.

    (c)   Five different machines can do any of the five required jobs, with different profits resulting from each assignment as shown in below table. Find out maximum profit possible through optimal assignment.

Machine

Job	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

    (d)   Obtain the optimal strategies for both players and value of the game for two person zero sum game whose pay-off matrix is as follows:

	B1	B2
A1	-6	7
A2	4	-5
A3	-1	-2

A4   -2   5

A5   7   -6

(e) What is sequencing Problem? Discuss Johnson Algorithm of sequencing for n Jobs and two machines.

(f) Use the graphical method to minimize the time needed to process the following jobs on the machines shown. Also calculate the total time elapsed time to complete both jobs.

		Machine				
Job-1	**Sequence – A**	A	B	C	D	E
	Time (hrs)	3	4	2	6	2
		Machine				
Job-2	**Sequence – A**	B	C	A	D	E
	Time (hrs)	5	4	3	2	6

(g) What is Queuing Theory? Briefly explain the important characteristics of queuing system?

(h) What is project? Differentiate between PERT and CPM.

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3 A certain output is manufactured at Rs 80 and sold at Rs 140 per unit. The product is such that if it is produced but not sold during a day's time it becomes worthless. The sales record is as follows:

Sales per day :   30   40   50   60   70

No. of days   :   24   24   36   24   12

(i)   Prepare a payoff and regret table.

(ii)   Find the expected payoffs and regret.

(iii)   Find the optimal act and EVPI

4 Solve the following transportation problem. Where transportation cost per unit from different origins to destinations is given (in rupees) as follows.

Destination

	I	II	III	IV	Availability
A	7	10	14	8	30
B	7	11	12	6	40
C	5	8	15	9	30
Demand	20	20	25	30	

Origin

Find the optimal transportation schedule and table the minimum transportation cost. If there are alternative solutions, show each of them.

5 The following table gives the activities in a construction project and other relevant information:

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

Duration :   20   25   10   12   6   10

(i)   Draw the network for the project.

(ii)   Find critical path

(iii)   Find free, total and independent floats of each activity.