Code: 14E00205

MBA II Semester Supplementary Examinations December/January 2017/2018

OPERATIONS RESEARCH

(For students admitted in 2014, 2015 & 2016 only)

Time: 3 hours Max. Marks: 60

SECTION – A

(Answer the following: (05 X 10 = 50 Marks)

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1 What are the various applications of operations research? Discuss.

OR

2 Solve the following LPP

Maximize $Z = 5x_1 + 6x_2$

Subjected to $2x_1 + 3x_2 \leq 12$

$3x_1 + 2x_2 \leq 12$

$x_1, x_2 \geq 0$

3 Find the optimal solution for the given unit cost matrix.

	P	Q	R	S	Supply
A	5	8	10	14	50
B	7	10	14	19	80
C	10	15	8	6	70
Demand	40	60	75	25	200

OR

4 Four men are available to do four different jobs. From past records, the time (in hours) that each man takes to do a job is known and is given in the following matrix.

	P	Q	R	S
A	2	3	4	5
B	4	6	8	10
C	7	10	13	16
D	11	15	19	23

Find the assignment of men to jobs that will minimize the total time taken.

5 The data given below indicates the processing time (in hours) of five jobs A, B, C, D and E on two machines M_1 and M_2 with sequence as $M_1 \rightarrow M_2$ for all jobs.

	A	B	C	D	E
M_1	4	13	8	11	4
M_2	8	5	10	15	7

Find the sequence of jobs to be performed so as to minimize total time and also find total elapsed time.

OR

6 Solve the game for the given payoff matrix.

	B_1	B_2	B_3	B_4
A_1	2	2	3	-2
A_2	4	3	2	6

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7 Explain in detail queuing system with examples.

OR

8 A departmental store has a single cashier. During the rush hours, customers arrive at the rate of 20 customers per hour. The average number of customers that can be processed by the cashier is 24 per hour. What is the: (i) Probability that the cashier is idle. (ii) Average number of customers in the queue. (iii) Average time a customer spends in the system. (iv) Average number of customers in the system.

9 What is replacement? Describe some important replacement situations and replacement policies.

OR

10 Construct network and compute earliest and latest times. Also identify critical path.

Activity	1 – 2	1 – 3	2 – 4	3 – 4	2 – 5	4 – 5
Optimistic time	5	12	15	2	8	21
Most likely time	7	13	18	3	10	26
Pessimistic time	12	17	21	5	14	35

SECTION – B

(Compulsory question, 01 X 10 = 10 Marks)

11 **Case Study:**

A company is making two products A and B. The cost of producing one unit of product A and B is Rs. 60 and Rs. 80 respectively. As per agreement, the company has to supply at least 200 units of product B to its regular customers. One unit of product A requires one machine hours whereas product B has machine hours available abundantly within the company. Total machine hours available for product A are 400 hours. One unit of each product A and B requires one labor hour each and total of 500 labor hours are available. The company wants to minimize the cost of production by satisfying the given requirements. Formulate the problem as a LPP.

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