Code: 9E00207

MBA & MBA (Finance) II Semester Supplementary Examinations December/January 2015/2016
OPERATIONS RESEARCH
(For students admitted in 2011, 2012, 2013 & 2014)

Time: 3 hours   Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks
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1   Explain six applications of operations research in managerial decision making.

2   Solve the following linear programming problem using Simplex method.
       Maximize z = 6x+6y
       Subject to constraints
       $3x + 2y \leq 18$
       $5x + 4y \leq 40$
       $x, y \geq 0$

3   Solve the following transportation problem to minimize the cost of transportation from factories to the markets. The cost of transporting each unit from each factory to each market is given in the matrix. Also given, the demand from each market and the capacity of each factory (in '000 units). Find the total cost of transportation for the optimal allocation.

	M_1	M_2	M_3	Supply capacity
F_1	5	10	8	500
F_2	9	9	4	600
F_3	3	6	7	800
F_4	5	6	2	300
F_5	1	3	6	200
Demand	750	750	900	

4   A certain salesman has to visit five customers (A, B, C, D, E) as part of his sales rounds. The distance between each customer's location and others in km is given in the matrix below. Identify the best sequence of visiting each customer so that he covers the minimum distance in doing so. How much is this optimal distance?

	A	B	C	D	E
A	-	5	15	3	20
B	5	-	11	10	9
C	15	11	-	8	3
D	3	10	8	-	12
E	20	9	3	12	-

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5   Two firms must simultaneously elect a technology to use for their compatible products. If the firms adopt different standards, few sales result. A common standard leads to higher sales. One technology is significantly preferred by consumers over the other. Thus, if the companies can standardize on the preferred technology, each obtains maximal profits. The payoff matrix is given below. Solve the game and find the optimal solution. Also find the value of the game. Is it a pure or a mixed game?

		Firm 2	
		Good	Bad
Firm 1	Good	5, 5	0, 0
	Bad	0, 0	3, 3

6   Five jobs are to be done on three machines M_1, M_2, M_3. Find the optimal sequence for the jobs using special case of Johnsons rule. Find the idle time on each machine and the total time needed to complete all the jobs.

	M_1	M_2	M_3
J_1	9	2	12
J_2	10	3	11
J_3	15	4	15
J_4	8	4	9
J_5	7	5	6

7   In a certain bank customers arrive at an average rate of 40 per hour following a Poisson distribution. The counter service rate is an average of 1 minute per customer following exponential distribution. Find the average waiting time of the customers in the queue and in the bank. Also calculate the average number of customers in the bank and the average length of the queue. What is the probability of the counter being empty?

8   (a) How will you find the probability of completing a PERT project by a particular due date?
    (b) Explain crashing of project networks.

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