Code: 9E00207

MBA II Semester Supplementary Examinations, March 2013
OPERATIONS RESEARCH

Time: 3 hours   Max Marks: 60

Answer any FIVE questions
All questions carry equal marks
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1   (a)   Write short note on quantitative analysis as a frame work for managerial decisions.
    (b)   Explain briefly the relationship between the quantitative specialist and the manager.

2   (a)   Give mathematical expression of a linear programming problem.
    (b)   Use simple method to solve the following LP problem
          Minimize $z = 3x + 2.5y$
          Subject to the constraints

$$2x + 4y \geq 40$$
$$5x + 2y \geq 50 \; and$$
$$x, y \geq 0.$$

3   (a)   Explain what a transportation problem is by giving an example.
    (b)   Solve the following transportation problem:

	A	B	C	D	Supply
I	9	16	15	9	15
II	2	1	3	5	25
III	6	4	7	3	20
Demand →	10	15	25	10	

4   (a)   Discuss the mathematical formulation of an assignment problem.
    (b)   Five jobs are to be assigned to 5 machines. The cast of assigning these jobs to the machine in rupees is given in the following matrix. Determine the optimal assignment, so as to minimize the total cost Calculate the total cost of optimal assignment:

Machines

		A	B	C	D	E
	1	6	7	5	9	4
	2	7	5	10	9	6
Jobs	3	5	4	3	6	5
	4	8	3	5	6	4
	5	4	7	5	6	6

5   (a)   How do you solve the game when:
             (i) Saddle point exists.   (ii) Saddle point not exists.
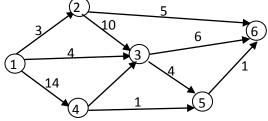   (b)   Solve the following 2 person zero sum game:

Player B		
10	5	-2
6	7	3
4	8	4

(Player A labels the rows)

6   We have five jobs each of which must go through the machines A,B and C in the order ABC

Processing times (in hours)					
Job no	1	2	3	4	5
Machine A	5	7	6	9	5
Machine B	2	1	4	5	3
Machine C	3	7	5	6	7

Determine a sequence for the jobs that will minimize the total elapsed time and idle time for each machine.

7   (a)   Define a queue. State the characteristics of waiting lines.
   (b)   Arrival rate of telephone calls at a telephone booth is according to Poisson distribution, with an average time of 9 minutes between two consecutive arrivals. The length of telephone calls is assumed to be exponentially distributes with mean 3 minutes. (i) Determine the probability that a person arriving at the booth will have to wait. (ii) Find the average queue length that forms time to time. (iii) The telephone company will install a second booth when convinced that an arrival would expect to have to wait at least four minutes for phone. Find the increase in flow of arrivals which will justify a second booth.

8   Calculate earliest start time, latest finish time, and total float for the network given in figure, below, also calculate the total project duration and show the critical path on the network

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