

Code :9E00207

MBA II Semester Supplementary Examinations, January 2011
OPERATIONS RESEARCH

(For students admitted in 2009-2010 only)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions
All questions carry equal marks

1. (a) What is the difference between quantitative and qualitative analysis? Give at least three examples.
- (b) What is model? What are its various types? Explain mathematical modeling process with an example.
2. (a) Explain the graphical method of solving an LPP involving two variables.
- (b) Solve the following problem by simplex method.

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

$$2x_1 + x_2 \leq 5$$
 Subject to $x_1 + x_2 \leq 3$
 $x_1, x_2 \geq 0$

3. (a) State the transportation problem. Describe clearly the steps involved in solving the problem.
- (b) Find the optimal solution to the following transportation problem in which the cells contain the transportation cost in rupees.

	W_1	W_2	W_3	W_4	W_5	Available
F_1	7	6	4	5	9	40
F_2	8	5	6	7	8	30
F_3	6	8	9	6	5	20
F_4	5	7	7	8	6	10
Required	30	30	15	20	5	

4. (a) What is an assignment problem? Give the mathematical formulations of an assignment problem.
- (b) A company has four machines to do three jobs. Each job can be assigned to one and only one machine. The cost of each job and each machine is given in the following table.

		Machines			
		M_1	M_2	M_3	M_4
Jobs	I	18	24	28	32
	II	8	13	17	19
	III	10	15	19	22

What are job assignments which will minimize the cost.

5. (a) Explain the terms:
 - i. Pure strategy,
 - ii. Mixed strategy,
 - iii. Saddle point.
- (b) Two companies are competing for the same product. Their different strategies are given in the following pay off matrix. What are best strategies for both the companies? Find the value of the game.

		Company A		
		a_1	a_2	a_3
Company B	b_1	4	-1	0
	b_2	-1	4	2

6. Use graphical method to minimize the time required to process the following jobs on the machines ie for each machine specify the job which should be done first. Also calculate the total elapsed time to couple both jobs.

		Machines				
Job1	Sequence	A	B	C	D	E
	time (hours)	7	9	5	13	5
Job2	Sequence	B	C	A	D	E
	time (hours)	11	9	7	5	13

7. A self-service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes, while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate find.
- Average number of customers in the system.
 - Average number of customers in the queue.
 - Average time a customer spends in the system.
 - Average time a customer waits before being served.

8. The utility data for a network is given by below. Determine the total, free and independent floats and identify the critical path.

Activity:	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Durations:	2	8	10	6	3	3	7	5	2	8
