8. a) What is the need of simulation? How can you use Monte Carlo simulation for industrial problem? 7

b) A newspaper vendor purchases newspaper for Rs.0.80 each and sells them for Rs.1 each. The daily demand of newspaper is distributed normally with a mean by 30 and standard deviation of 1. If the vendor cannot return unsold papers. How many papers should be purchase daily? Use Monte Carlo simulation technique and simulate 10 samples? 7

******

MMIE - 104

M.E./M.Tech., I Semester

Examination, December 2015

Quantitative Techniques in Management

Time : Three Hours

Maximum Marks : 70

Note : i) Answer any five questions.

ii) All questions carry equal marks.

1. a) Discuss the origin and development of OR. What are the limitations ? 7

b) A security dealer recommends two types of investments A and B to his client. Investment A, returns 6% and B, 8%. The client has almost Rs.1,00,000 to invest. The client wants the total annual return to be atleast Rs.7000 and atleast 2/5th of the amount to be unvested in investment B. The security dealer gets 5% of the income from investment A and 4% of the income from investment B. Construct mathematical model for the problem to maximize the total fee of the security dealer. 7

2. a) What is transportation problem? How is it a special case of L.P problem? 7

b) Find the initial basic feasible solution to the following transportation problem by north-west corner rule. 7

	To			Supply
	2	7	4	5
	3	3	1	8
From	5	4	7	7
	1	6	2	14
Demand	7	9	18	

3. Solve the following assignment problem to minimize time: 14

Jobs

	1	2	3	4	5
1	2	9	3	7	1
2	6	8	7	6	1
3	4	6	5	3	1
4	4	2	7	3	1
5	5	3	9	5	1

A sales manager has to assign 4 salesmen to 4 territories. The possible profit for each salesman in each territories is given below. Find the assignment that maximizes the profit.

14

Territories

	A	B	C	D
1	35	26	28	37
2	27	37	29	40
3	36	24	32	33
4	24	32	25	28

5. Use the Big M-method to

Minimize $z = 60x_1 + 80x_2$

Subject to $x_1 \leq 400$

$x_2 \geq 200$

$x_1 + x_2 = 500$

$x_1, x_2 \geq 0$

6. Goods trucks arrive randomly at a stockyard with a mean of 1 trucks/hour. A crew of four operatives can unload a truck in minutes. Trucks waiting in queue to be unloaded are paid waiting charge at the rate of Rs.60 per hour. Operatives ar paid a wage rate of Rs.20 per hour. It is possible to augmer the crew strength to 2 or 3 (of four operatives per crew) whe the unloading time will be 4 minutes or 3 minutes respectivel per truck. Find the optimal crew size. 1

7. a) State and prove minimax theorem for two-person zer sum games.

b) Solve the following games by reducing them to 2× games by graphical method:

B

	3	0	6	−1	7
A	−1	5	−2	2	1