Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA - SEMESTER–II • EXAMINATION – SUMMER • 2014

Subject Code: 2820007 **Date: 04-06-2014**

Subject Name: Quantitative Analysis – II (QA–II)

Time: 14.30 pm - 17.30 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 (a) Briefly explain the major applications of linear programming in business. **07**

(b) Obtain graphically the solution to the following LPP: **07**

Maximize $Z = x_1 + 30x_2$

Subject to

$$x_1 + 2x_2 \leq 9$$
$$x_1 + 4x_2 \leq 11$$
$$x_1 - x_2 \geq 2$$
$$x_1, x_2 \geq 0$$

Q.2 (a) Write the dual of the following linear programming problems: **07**

(a)

Minimize $Z = 2x_1 + 9x_2 + 3x_3$

Subject to

$$x_1 + 4x_2 + 2x_3 \geq 5$$
$$3x_1 + x_2 + 2x_3 \geq 4$$
$$x_1, x_2 \geq 0, \quad x_3 \text{ unrestricted in sign}$$

(b)

Maximize $Z = 3x_1 + 4x_2 + 7x_3$

Subject to

$$x_1 + x_2 + x_3 \leq 10$$
$$4x_1 - x_2 - x_3 \geq 15$$
$$x_1 + x_2 + x_3 = 7$$
$$x_1, x_2 \geq 0, \quad x_3 \text{ unrestricted in sign}$$

(b) What is Simplex method? Explain various conditions of simplex method. **07**

OR

(b) Describe sensitivity analysis. Explain the basic concepts of Sensitivity Analysis. **07**

Q.3 (a) How many air-conditioners to transport from each factory to each wholesaler on a monthly basis in order to minimize the total cost of transportation? **07**

Data:

Factory	Supply	wholesaler	Demand
1	150	A	200
2	175	B	100
3	275	C	300
Total	600 ACs	Total	600 ACs

Transport cost from Factory to Wholesaler (Rs./AC)

Factory	A	B	C
1	6	8	10
2	7	11	11
3	4	5	12

Find initial feasible solution by using N/W corner method, Least cost method and VAM method.

(b) A salesman has to visit four cities A, B, C, and D. The inter-city distances are given as follows: **07**

From/To	A	B	C	D
A	-	4	7	3
B	4	-	6	3
C	7	6	-	7
D	3	3	7	-

If the salesman starts from city A and has to back to city A, which route should he select so that the total distance travelled by him is the minimum?

OR

Q.3 (a) ABC company is engaged in manufacturing 5 brands of packed snacks. It is having five manufacturing setups, each capable of manufacturing any of its brands one at a time. The cost to make a brand on these setups vary according to the table below: **07**

	S_1	S_2	S_3	S_4	S_5
B_1	4	6	7	5	11
B_2	7	3	6	9	5
B_3	8	5	4	6	9
B_4	9	12	7	11	10
B_5	7	5	9	8	11

Find the optimum assignment of products on these setups resulting in the minimum cost.

(b) A company has three plants and three warehouses. The supply and demand in units and the corresponding transportation costs are given. Below table shows initial solution of problem. **07**

From \ To	A	B	C	Supply
1	[6]	[8] 25	[10] 125	150
2	[7]	[11]	[11] 175	175
3	[4] 200	[5] 75	[12]	275
Demand	200	100	300	600

Find optimal solution by using stepping stone method.

Q.4 (a) What is queuing theory? In what type of problem situation can it be applied successfully? Discuss giving examples. **07**

(b) A bakery keeps stock of a popular brand of cakes. Previous experience shows the daily demand pattern for the item with associated probabilities, as given: **07**

Daily demand (Nos.):	0	10	20	30	40	50
Probability :	0.01	0.20	0.15	0.50	0.12	0.02

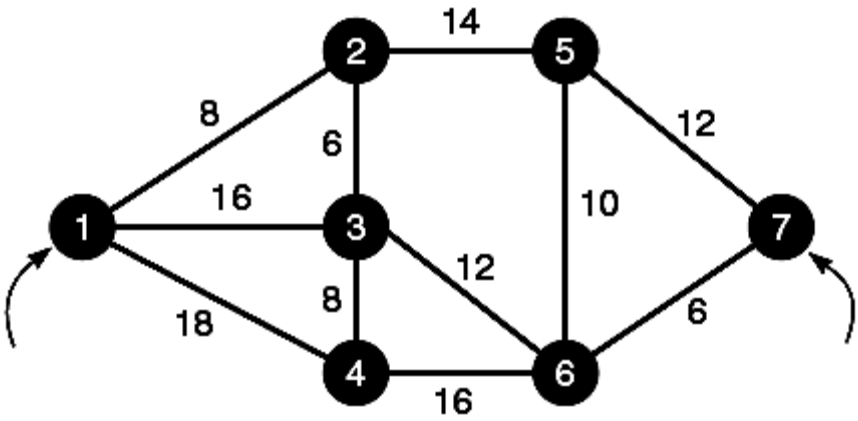
Us the following sequence of random numbers to simulate the demand for next 10 days. Also find out the average demand per day.

Random numbers : 25, 39, 65, 76, 12, 05, 73, 89, 19, 49

OR

Q.4 (a) What is simulation? Discuss Monte Carlo simulation with example. **07**

(b) The network of below figure shows the highways and cities surrounding Gujarat & Maharashtra. Slick, a bicycle helmet manufacturer, must transport his helmets to a distributor based in Maharashtra. To do this, he must go through several cities. Manager would like to find the shortest way to get from Gujarat to Maharashtra. What do you recommend? (All distances are in '00. Node 1 represents Gujarat and node 7 represents Maharashtra). **07**



Q.5 **(a)** What do you understand by Markov process? In what areas of management can it be applied successfully? **07**

(b) What is an unbalanced assignment problem? How is the Hungarian Assignment Method applied in respect of such problem? **07**

OR

Q.5 **(a)** What is degeneracy? How does the problem of degeneracy arise in a transportation problem? How can we deal with this problem? **07**

(b) What are network models? Explain various types of network models. **07**

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