USN ☐☐☐☐☐☐☐☐☐☐   **16MBA14**

First Semester MBA Degree Examination, June/July 2017
Quantitative Methods

Time: 3 hrs.   Max. Marks:80

Note: *1. Answer any FOUR full questions from Q1 to Q7.*
2. Question No. 8 is compulsory.
3. Scientific calculator allowed.

1 a. What is meant by dispersion? In your opinion which is the best method of finding out dispersion?   **(02 Marks)**

   b. Solve the following transportation problem for maximum profit. only by initial basic feasible solution   **(06 Marks)**

Per unit profit (Rs.)

Market

		A	B	C	D
	X	12	18	6	25
Warehouse	Y	8	7	10	18
	Z	14	3	11	20

Available at warehouses		Demand in the markets	
X :	200 units	A :	180 units
Y :	500 units	B :	320 units
Z :	300 units	C :	100 units
		D :	400 units

   c. The following data give the test scores and sales made by nine sales men during certain period :

Test sores :	14	19	24	21	26	22	15	20	19
Sales ('00 Rs.) :	31	36	48	37	50	45	33	41	39

Find the regression equations and also estimate the most probable sales volume of a salesman making a score of 28.   **(08 Marks)**

2 a. For a pair of variables x and y, it was computed that $b_{xy} = 0.85$, $b_{yx} = 0.89$ and $\sigma_x = 8$. Establish relationship between the variables x and y.   **(02 Marks)**

   b. A merchant's file of 20 accounts contains 6 delinquent and 14 non – delinquent accounts. An auditor randomly selects 5 of these accounts for examination :
   i) What is the probability that the auditor finds exactly 2-delinquent accounts?
   ii) Find the expected number of delinquent accounts in the sample selected.   **(06 Marks)**

   c. Calculate the median of the following distribution :

Annual sales (Rs. '000)	Frequency	Annual sales (Rs.'000)	Frequency
Less than 10	4	Less than 40	55
Less than 20	20	Less than 50	62
Less than 30	35	Less than 60	67

Is it possible to calculate the arithmetic mean? If possible calculate it.   **(08 Marks)**

3   a. Define random variable with example. **(02 Marks)**

     b. Given the following information on a small project : A is the first activity of the project and precedes the activities B and C. The activity D succeeds both B and C where as only C is required to start activity E. D precedes F while G succeeds E. H is the last activity of the project and succeeds F and G. Draw a network based on this information. **(06 Marks)**

     c. What is 'Decision theory'? Explain the steps of decision making process. **(08 Marks)**

4   a. What are decision trees? **(02 Marks)**

     b. Calculate standard deviation and coefficient of variation from the following data :

Age under (in year)	10	20	30	40	50	60	70	80
Number of persons dying	15	30	53	75	100	110	115	125

Here total number of persons dying is 125. **(06 Marks)**

     c. Solve the following problem by using graphical method :

Minimize $Z = 3x_1 + 5x_2$

Subject to $-3x_1 + 4x_2 \leq 12$

               $2x_1 + 3x_2 \geq 12$

               $2x_1 - x_2 \geq -2$

and $x_1 \leq 4$; $x_2 \geq 2$; $x_1, x_2 \geq 0$. **(08 Marks)**

5   a. What is a redundant constraint? **(02 Marks)**

     b. From the following data calculate the rank correlation coefficient after making adjustment for tied ranks. **(06 Marks)**

x	48	33	40	9	16	16	65	24	16	57
y	13	13	24	6	15	4	20	9	6	19

     c. The mean and standard deviation of the wages of 6000 workers engaged in a factory are Rs 1200 and Rs 400 respectively. Assuming the distribution to be normal estimate :

Percentage of workers getting wages above Rs. 1600

Number of workers getting wages between Rs. 1100 and Rs. 1500

The relevant extract of the area table (under the normal curve) from $z = 0$ to $z = z$ is given below :

Z	0.25	0.5	0.6	0.75	1.00	1.25	1.5
Area	0.0987	0.1915	0.2257	0.2734	0.3413	0.3944	0.4332

(08 Marks)

6   a. Write Poisson formula with mean and variance. **(02 Marks)**

     b. Explain what do you mean by decision making :

i) Under certainty ii) under uncertainty. **(06 Marks)**

     c. Draw a network corresponding to the following information :

Activity	1 – 2	1 – 3	2 – 6	3 – 4	3 – 5	4 – 6	5 – 6	5 – 7	6 – 7
Duration	4	6	8	7	4	6	5	19	10

i) Draw a network

ii) Obtain early and late start time and completion times

iii) Determine the critical path. **(08 Marks)**

7   a.   What kind of decision making situation may be analysed using PERT and CPM?   (02 Marks)
    b.   Use north west corner method (NWCM) and least cost method (LCM) to find an initial basic
         feasible solution to the transportation problem.   (06 Marks)

	D_1	D_2	D_3	D_4	Supply
S_1	19	30	50	10	7
S_3	70	30	40	60	9
S_3	40	8	70	20	18
Demand	5	8	7	14	34

    c.   Explain the following in brief :
         i) Multiple regression   ii) Baye's theorem   iii) Decision tree analysis.   (08 Marks)

8   a.   From the prices of shares of x and y below find out which is more stable in value :

x	35	54	52	53	56	58	52	50	51	49
y	108	107	105	106	107	104	103	104	105	101

   (08 Marks)
    b.   A small project is composed of 2 activities whose time estimates are listed in the table
         below. Activities are identified by their beginning (i) and ending (j) node numbers.

Activity	Estimated duration (weeks)		
(i − j)	Optimistic (t_c)	Most likely (t_m)	Pessimistic (t_p)
1 − 2	1	1	7
1 − 3	1	4	7
1 − 4	2	2	8
2 − 5	1	1	1
3 − 5	2	5	14
4 − 6	2	5	8
5 − 6	3	6	15

    i) Draw the network diagram
    ii) What is expected project length?
    iii) Calculate variance and standard deviation of the project length.   (08 Marks)

* * * * *