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18MBA14

First Semester MBA Degree Examination, Jan./Feb.2021
Business Statistics and Analytics

Time: 3 hrs.   Max. Marks:100

Note: *1. Answer any FOUR full questions from Q1 to Q7.*
2. Question No.8 is compulsory.
3. Use of Statistical table is permitted.

1   a. Explain the methods of computing correlation.   (03 Marks)
    b. Calculate the mean-deviation from the following data: (07 Marks)

Quantity Demanded (units)	10	20	30	40	50	60	70	80	90	100
Frequency		7	13	16	6	14	19	28	17	21	9

    c. Ten competitors in a beauty contest are ranked by 3 judges as follows:

Judges	Competitors									
	1	2	3	4	5	6	7	8	9	10
A	6	5	3	10	2	4	9	7	8	1
B	5	8	4	7	10	2	1	6	9	3
C	4	9	8	1	2	3	10	5	7	6

Discuss which pair of judges has the nearest approach to common taste of beauty. **(10 Marks)**

2   a. List and explain common errors in drawing networks.   (03 Marks)
    b. From the prices of shares of X and Y below, find out which is more stable in value.   (07 Marks)

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

    c. Calculate Karl Pearson coefficient of correlation.

X	42	52	55	60	66	68	65	60	58	34
Y	11	13	18	22	26	40	31	27	24	18

                                                                                        (10 Marks)

3   a. What are the difference between correlation and Regression analysis?   **(03 Marks)**
    b. In a certain factory turning out razor blades. There is a small change of 0.002 for any blade to be defective. The blades are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets.   **(07 Marks)**
    c. The life time in hours of a certain electrical equipment has the normal distribution with mean = 80 and standard deviation = 16.
        (i)   What is the probability that the equipment lasts atleast 100 hours?
        (ii) If the equipment has already lasted 88 hours what is the conditional probability that it will last atleast another 12 hours?   **(10 Marks)**

4   a. What are the main objectives of analyzing time series?   **(03 Marks)**
    b. Fit a trend line by the method of semi-averages to the data given below. Estimate the sales for 2004.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Sale	200	120	280	240	160	320	360	400	320	360	360

                                                                                        (07 Marks)

    c. The following table shows the age (X) and blood pressure (Y) of 8 persons.

X	52	63	45	36	72	65	47	25
Y	62	53	51	25	19	43	60	33

Obtain the regression equation of Y on X and find the expected blood pressure of a person who is 49 years old.   **(10 Marks)**

5   a.   What is transportation problem?   **(03 Marks)**
    b.   Explain the different method of measuring trend.   **(07 Marks)**
    c.   Fit an equation of the type $Y = a + bX$ for the following data and estimate the value for the
         year 2007.

Year	2001	2002	2003	2004	2005
Sales	30	50	80	110	170

(10 Marks)

6   a.   What is Linear programming?   **(03 Marks)**
    b.   Use the graphical method to solve the following linear programming problem.
         Minimize $Z = 40x + 30y$

         Subject to constraints $2x + 6y \geq 9$

         $$4x + y \geq 6$$

         $$x, y \geq 0$$ **(07 Marks)**

    c.   The activities of a project and other related information are given in table below.

Activity	Optimistic time	Most likely time	Pessimistic time
1 – 2	30	44	54
1 – 3	8	12	16
2 – 3	1	2	3
2 – 4	2	3	5
3 – 4	8	10	12
4 – 5	14	22	25

    (i)   Construct a PERT diagram.
    (ii)   Determine the probability of completion of a project in less than 60 days.   **(10 Marks)**

7   a.   Write the difference between PERT and CPM.   **(03 Marks)**
    b.   Construct the network diagram for the various activities of a project and precedence
         relationship between them are shown in following table: **(07 Marks)**

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor	_	_	_	A	B	B	C	D	E	H, I	F, G

    c.   The table below gives a list of jobs and their duration in days,
         (i)   Draw the network and find the critical path and its duration.
         (ii)   Calculate ES, EF, LS, LF and total float.

Activity	a	b	c	d	e	f
Immediate Predecessor	_	_	a, b	a	d	c, e
Duration (in days)	3	14	3	7	4	10

(10 Marks)

8   Find the initial basic feasible solution for the following transportation model using,
    (i)   North-west corner role.
    (ii)   Least cost method.
    (iii) Vogels approximation method.

	P	Q	R	Supply
A	1	2	6	7
B	0	4	2	12
C	3	1	5	11
Demand	10	10	10	

(20 Marks)

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