20MBA14

First Semester MBA Degree Examination, Dec.2023/Jan.2024
Business Statistics

Time: 3 hrs.

Max. Marks:100

Note: 1. *Answer any FOUR full questions from Q.No.1 to Q.No.7.*
2. *Question No. 8 is compulsory.*
3. *Use of statistical table is permitted.*

1 a. What do you mean statistics? (03 Marks)
   b. Construct a scatter plot for the data obtained in a study of age and blood pressure of six randomly selected people. The data are shown in the table. (07 Marks)

Subject	A	B	C	D	E	F
Age	43	48	56	61	67	70
Blood Pressure	128	120	135	143	141	152

   c. A survey was conducted to determine the age (in years) of 120 automobiles. The result of survey is as follows :

Age of Auto	0 – 4	4 – 8	8 – 12	12 – 16	16 – 20
Number of Auto's	13	29	48	22	8

   Find the Median age, Modal age of autos and also find mean age. (10 Marks)

2 a. What do you mean by correlation? (03 Marks)
   b. Explain the different types of correlation. (07 Marks)
   c. You are given below the daily wages paid to the workers in two factories X and Y.

Daily wages	Factory "X" (# of workers)	Factory "Y" (# of workers)
12 – 13	15	25
13 – 14	30	40
14 – 15	44	60
15 – 16	60	35
16 – 17	30	12
17 – 18	14	15
18 – 19	07	05

   Using appropriate measures answer the following :
   (i) Which factory pays higher wage?
   (ii) Which factory has a more consistent wage structure? (10 Marks)

3 a. List the difference between simple and multiple regression with example. (03 Marks)
   b. Interpret Rank Correlation co-efficient between marks assigned to 10 students by judge X and Y in a certain competitive test.

Judge X	52	53	42	60	45	41	37	38	25	27
Judge Y	65	68	43	38	77	48	35	30	25	50

   (07 Marks)
   c. From the following data interpret the two regression equations :

Sales	91	97	108	121	67	124	51	73	111	57
Purchase	71	75	69	97	70	91	39	61	80	47

   (10 Marks)

4   a. Name the rules of probability with formula.   (03 Marks)
    b. A hospital has 20 kidney dialysis machines and the chance of any one of them not functioning during any day is 0.02 you are required to find the probability that exactly 3 machines will be out of service on the same day.
        (i)   Can we use the binomial formula to find out this probability? If yes, apply binomial probability distribution method.
        (ii) Can we use the Poisson formula to find out this? If yes apply poisson probability distribution method.   (07 Marks)
    c. The number of defects per unit in a sample of 330 units of manufacturing product has given below. Apply a Poisson distribution to the data given (C − 0.439 = 0.6447)

No. of defects	0	1	2	3	4
No. of units	214	92	20	3	1

                                                                                        (10 Marks)

5   a. What is meant by time series analysis? Mention the uses.   (03 Marks)
    b. You have been provided with the figures a production (in 000's tons) of sugar factory.

Year	2013	2014	2015	2016	2017	2018	2019
Production	77	88	94	85	91	98	90

        (i)   Fit a straight line and apply the method of least square and find the trend value.
        (ii) What is the yearly increase in production? Estimate production in 2022.   (07 Marks)
    c. Calculate the seasonal index for the following data assuming that there is no need to adjust the data for the trend (simple average method)

Quarter	2018	2019	2020	2021	2022	2023
1	3.5	3.5	3.5	4.0	4.1	4.2
2	3.9	4.1	3.9	4.6	4.4	4.6
3	3.4	3.7	3.7	3.8	4.2	4.3
4	3.6	4.8	4.0	4.5	4.5	4.7

                                                                                        (10 Marks)

6   a. Mention : (i) Type I and Type II errors. (ii) List the types of hypothesis testing.   (03 Marks)
    b. Explain the procedure of hypothesis test described various stages involved.   (07 Marks)
    c. The sales data of an item in six shops before and after a special promotional campaign are as under.

Shops	A	B	C	D	E	F
Before campaign	53	28	31	48	50	42
After campaign	58	29	30	55	56	45

    Can the campaign be judged to be a success? Test at 5% level of significance.   (10 Marks)

7   a. List the objectives and components of time series analysis.   (03 Marks)

    b. Calculate Median, Upper quartiles, 3rd Decile from the following data:

Heights in CM	145–150	150–155	155–160	160–165	165–170	170–175	175–180
No. of persons	2	4	12	22	30	25	10

                                                                                        (07 Marks)
    c. From the following table, calculate the co-efficient of correlation by karl pearson's method.

x	6	2	10	4	8
y	9	11	5	8	7

                                                                                        (10 Marks)

8   **CASE STUDY: (compulsory)**

The hourly wages of 1000 workmen are normally distributed around mean of Rs.70 and with a standard deviation of Rs.5 estimate the number of workers whose hourly wages will be,

    (i)   Between Rs.65 and Rs.70.

    (ii)   More than Rs.75.

    (iii)   Less than Rs.63

    (iv)   Greater than or equal to Rs.72

    (v)   Also estimate the lowest hourly wages of the 100 highest paid workers.

Apply the method of Normal distribution model for the data.   **(20 Marks)**

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