CBCS SCHEME

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20MBA14

First Semester MBA Degree Examination, Feb./Mar.2022
Business Statistics

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 tables is allowed.

1 a. Find the average rate of increase in population which in the first decade has increased by 20%, in the second decade by 30% and in the third decade by 40%. **(03 Marks)**

b. Measure the 3rd quartile, 2nd decile and 95th percentile for the following data:

Marks	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69
Frequency	12	27	34	41	23	3

(07 Marks)

c. The weekly sales of products A and B are recorded in the following table. Examine which one shows greater fluctuation in sales.

Product A	59	75	27	63	27	28	56
Product B	150	200	125	310	330	250	225

(10 Marks)

2 a. Interpret the values of r = 0, r = –1 and r = +1. **(03 Marks)**

b. Explain the scope of statistics. **(07 Marks)**

c. Calculate the coefficient of correlation by Karl Pearson's method from the following:

Overheads (in '000 Rs.)	80	90	100	110	120	130	140	150	160
Cost (in '000 Rs.)	15	15	16	19	17	18	16	18	19

(10 Marks)

3 a. Determine the two regression coefficients when r = 0.8, $\sigma_x = 5$ and $\sigma_y = 7$. **(03 Marks)**

b. The average percentage of failures in a certain examination is 40. What is the probability that out of a group of 6 candidates, at least 4 passed in the examination. What is the probability that at the most 2 passed. **(07 Marks)**

c. In an intelligence test administered to 500 students and data is normally distributed. The average score was 42 and standard deviation was 24. Find (i) The number of students whose score exceeded 50. (ii) The number of students who scored between 30 and 40. (iii) The number of students who scored above 60. **(10 Marks)**

4 a. Explain the uses of time series analysis. **(03 Marks)**

b. A sample of 200 bulbs made by a company gives a lifetime mean of 1540 hours? With a standard deviation of 42 hours. It is likely that the sample has been drawn from a population with a mean lifetime of 1500 hours. Evaluate at 5% level of significance. **(07 Marks)**

c. The information given below relates to the sales and advertisement expenditure of the firm,

	Advertisement Expenses (Rs. lakhs)	Sales (Rs. lakhs)
Arithmetic mean	20	100
Standard deviation	3	12

Coefficient of correlation r = 0.8

(i) Find the two regression equations.
(ii) What should be the advertisement expenditure if the firm proposes a sales target of Rs.120 lakhs. **(10 Marks)**

5 a. A uniform die is thrown at random. What is the probability that the number on it is greater than 4. **(03 Marks)**

b. Explain the components of time series. **(07 Marks)**

c. Calculate (i) Three yearly (ii) Five yearly, moving averages for the following data:

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Y	242	250	252	249	253	255	251	257	260	265	262

(10 Marks)

6 a. Compare Type I error and Type II error. **(03 Marks)**

b. Explain ANOVA, K-W test and Mann-Whitney test. **(07 Marks)**

c. A systematic sample of 100 pages was taken from the concise Oxford Dictionary and the observed frequency distributon of foreign words per page was found to be as follows:

No. of foreign words per page (X)	0	1	2	3	4	5	6
Frequency (f)	48	27	12	7	4	1	1

Calculate the expected frequencies using Poisson distribution. Also compute the mean and variance of fitted distribution. **(10 Marks)**

7 a. Discuss the applications of binomial distribution with example. **(03 Marks)**

b. A selects 8 salesmen at random and the sales figures for the previous month are recorded. They then undergo a training course. Their sales figure for the following month are recorded as shown in the table. Test if the training course, caused an improvement in the salesmen's ability? Choose 5% level of significance. The table value for V = 7 is 1.8975.

Previous month	75	90	94	95	100	90	70	64
Following month	77	101	93	92	105	88	76	68

(07 Marks)

c. Given below are the values of production ('000 tons) of a steel factory.
(i) Fit a straight line trend by the method of least squares.
(ii) Determine the monthly increase in production.

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

(10 Marks)

8 Case Study :
Using 'Ratio to trend' method, determine the quarterly seasonal indices for the following data:

Production of steel (in million tons)

Year	Q_1	Q_2	Q_3	Q_4
1	68	60	61	63
2	70	58	56	60
3	68	63	68	67
4	65	56	56	62
5	60	55	55	58

(20 Marks)

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