CBCS SCHEME

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20MBA14

First Semester MBA Degree Examination, June/July 2023
Business Statistics

Time: 3 hrs. Max. Marks:100

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

1 a. The following table gives the age distribution of a group of 50 individuals:

Age (years)	16-20	21-25	26-30	31-35
No. of persons	10	15	17	8

Determine range and coefficient of range. **(03 Marks)**

b. Solve the missing frequencies for the following series. The median is 27.5 and the number of items is 50.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	4	-	20	-	7	3

(07 Marks)

c. An analysis of monthly wages paid to workers in two firms A and B belonging to the same industry gives the following results:

Particulars	A	B
No. of wage earners	550	650
Average weekly wages	1450	1400
Standard deviation	$\sqrt{10000}$	$\sqrt{19600}$

Determine the following:

I. Which firm pays out larger amount as weekly wages?

II. Which firm has greater variability in wages?

III. What are the measures of (i) average weekly wages ii) Standard deviation of wages of all workers in two firms taken together. **(10 Marks)**

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

b. A company launches an advertisement campaign of its new product on TV radio and in print media in an area where 30% watch TV, 50% listen to the radio and the rest rely on newspapers. It is estimated that a person who sees advertisement on TV will buy the product with probability 0.6. A person who has heard it on radio is expected to buy the product with probability 0.3 and seeing the advertisement in print will convince a person to buy the product with probability 0.1. A consumer chosen at random is found to have purchased the product. What is the probability he heard about the product on radio? **(07 Marks)**

c. In an intelligence test administered to 500 students, 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)**

3 a. Explain mutually exclusive events. **(03 Marks)**

b. Calculate Spearman's rank correlation coefficient between advertisement cost and sales from the following data:

Advertisement (Rs. in '000)	39	65	62	90	82	75	25
Sales (Rs. in lakhs)	47	53	58	86	62	68	60
Advertisement (Rs. in '000)	98	36	78				
Sales (Rs. in lakhs)	91	51	84				

(07 Marks)

c. Discuss the scope of statistics. **(10 Marks)**

4 a. Explain time series. **(03 Marks)**

b. Elaborate 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
Y	242	250	252	249	253	255
Year	2016	2017	2018	2019	2020	
Y	251	257	260	265	262	

(10 Marks)

5 a. Explain hypothesis. **(03 Marks)**

b. Compare parametric and non parametric tests. **(07 Marks)**

c. The sales data of a product in six shops before and after a special promotion campaign are as follows:

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

Can the campaign be judged to be a success? Test at 5% level of significance. The table value of t for 5 degrees of freedom at 5% level of significance is 2.015. **(10 Marks)**

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

b. Explain scatter diagram method of studying correlation. **(07 Marks)**

c. Discuss ANOVA, K-W test and Mann Whitney test. **(10 Marks)**

7 a. Explain formula bar in excel. **(03 Marks)**

b. Appraise the methods used for the study and measurement of trend in time series. **(07 Marks)**

c. Given below are the values of production ('000 tons) of a steel factory.

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

i) Fit a straight line by the method of least squares.

ii) Determine the monthly increase in production. **(10 Marks)**

8 CASE STUDY (Compulsory)

Using 'ratio to trend' method, determine the quarterly seasonal indices for the following data:

	Production of aluminium (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)