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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, January 2024

First Degree Programme Under CBCSS

Statistics

Complementary Course for Mathematics

ST 1131.1 — DESCRIPTIVE STATISTICS AND BIVARIATE ANALYSIS

(2022 Admission Onwards)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **1** mark.

1. What is a frequency distribution?
2. Define ratio scale with an example.
3. Find the arithmetic mean of the numbers 1, 2. ..., n.
4. Define kurtosis.
5. What is bivariate data?
6. Define coefficient of variation.
7. What is the principle of least squares?
8. What is the empirical relationship between standard deviation, mean deviation and quartile deviation?

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9. If the correlation coefficient $r = 1$, what is the relation between b_{yx} and b_{xy}?

10. What is coefficient of alienation?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. Each question carries **2** marks.

11. What are different sources of primary data?

12. Distinguish between questionnaire and schedule.

13. Define relative frequency and frequency density.

14. Three samples of sizes 80, 40 and 30 having means 12.5, 13 and 11 respectively are combined. Find the mean of the combined sample.

15. Calculate the harmonic mean of 2,3, 4, 5 and 7.

16. Show that standard deviation is affected by change of scale.

17. Given mean is 34.5, mode 35 and variance 25. Find a measure of skewness.

18. Draw rough sketches of positively skewed and negatively skewed frequency curves and indicate the relative positions of mean, median and mode.

19. Write down the normal equations for fitting parabola $y = ax^2 + bx + c$.

20. Distinguish between correlation and regression.

21. From the following information, obtain the correlation coefficient.

$n = 12$, $\Sigma x = 30$, $\Sigma y = 5$, $\Sigma x^2 = 670$, $\Sigma y^2 = 285$, $\Sigma xy = 334$

22. List any four properties of correlation coefficient.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. Each question carries **4** marks.

23. Explain systematic and stratified sampling.

24. Distinguish between census and sampling.

25. Calculate AM from the following data.

Class:	0-10	10-20	20-30	30-40	40-50
Frequency:	3	12	20	10	5

26. The first four moments of a distribution about the value 5 of the variables are 2, 20, 40 and 50. Find the mean, variance, third and fourth central moments.

27. Explain Sheppard's correction for moments.

28. Calculate median for the data given below.

Class:	0-6	7-13	14-20	21-27	28-34	35-41
Frequency:	8	17	28	15	9	3

29. Explain the least square method of fitting a curve of the form $y = ae^{bx}$.

30. Explain scatter diagram. How will you infer that the correlation is positive or negative from a scatter diagram?

31. If the regressions equations are $2y - 1.2x - 3.5 = 0$ and $2x - 0.8y - 4.2 = 0$, find the correlation coefficient between x and y.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. Each question carries **15** marks.

32. The sales of two salesman A and B of a company over a sample of days were as follows (in 000's of Rupees)

A:	5.5	2.5	6.0	3.5	4.5	5.0	5.0	4.0
B:	4.5	2.0	3.5	2.5	4.0	5.0	2.5	4.0

Find out who is more consistent in his sales.

33. Calculate Bowley's coefficient of skewness for the following data and comment on the result.

Class:	0-10	10-20	20-30	30-40	40-50
Frequency:	8	15	24	21	12

34. Fit a curve of the form $y = ax + bx^2$ to the following data.

x:	1	2	3	4	5
Y:	1.8	5.1	8.9	14.1	19.8

35. Given the two equations for the regression lines:

$8x - 10y + 66 = 0$ and $40x - 18y - 214 = 0$

(a) Identify the regression lines of Y on X and X on Y.

(b) Obtain the regression coefficients and the correlation coefficient.

(c) Find the means of X and Y.

(d) Given the standard deviation of X is 4. Find the standard deviation of Y.

($2 \times 15 = 30$ Marks)
