

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, November 2018
First Degree Programme under CBCSS
Complementary Course for Mathematics
ST 1131.1 – DESCRIPTIVE STATISTICS
(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. Define census.
2. State the two methods of sampling.
3. Define arithmetic mean.
4. What is the empirical relationship between mean, median and mode ?
5. What is an inter quartile range ?
6. Express the 4th central moment in terms of raw moments.
7. What is the moment measure of kurtosis ?
8. Write the relationship between regression coefficient and correlation coefficient.
9. What is the use of a regression equation ?
10. What is correlation. **(10×1=10 Marks)**

SECTION – B

Answer **any 8** questions. **Each** question carries **2** marks.

11. Define simple random sampling with and without replacement.
12. Define stratified random sampling.



13. How will you construct a frequency polygon ?
14. How do you distinguish a symmetrical distribution from a non-symmetrical distribution ?
15. Define coefficient of range.
16. Explain Karl Pearsons measure of skewness.
17. Distinguish between absolute and relative measure of dispersion.
18. The values of mode and median for a moderately skewed distribution are 64.2 and 68.6 respectively. Find the value of the mean.
19. Write the normal equation for fitting a curve of the form $y = ax^b$.
20. What do you mean by curve fitting ?
21. What is meant by perfect correlation ?
22. Distinguish coefficient of correlation from coefficient of variation. **(8×2=16 Marks)**

SECTION – C

Answer **any 6** questions. **Each** question carries **4** marks.

23. Distinguish between primary and secondary data.
24. Distinguish between probability and non-probability sampling.
25. Explain the different steps in the construction of frequency table for a given set of observations.
26. Calculate the range and semi-inter quartile range of wages :
Wages (Rs.) : 30 – 32 32 – 34 34 – 36 36 – 38 38 – 40 40 – 42 42 – 44
Labourers : 12 18 16 14 12 8 6
Also calculate the quartile coefficient of dispersion.
27. The arithmetic mean and standard deviation of a series of 20 items were calculated by a student as 20 cm and 3 cm respectively. But while calculating them an item 13 was misread as 30. Find the correct standard deviation.



- 28. Show that mean deviation about median is a minimum.
- 29. Show that correlation coefficient is independent of change of origin and scale.
- 30. Explain the principle of least squares. Describe how an exponential curve of the form $y = ab^x$ can be fitted.
- 31. You are given the following data :

	X	Y
Arithmetic mean	36	85
Standard deviation	11	8

Correlation coefficient between X and Y is 0.66

- a) Find the two regression equations and
- b) Estimate the value of X, when $Y = 75$.

(6×4=24 Marks)

SECTION – D

Answer **any 2** questions. **Each** question carries **15** marks.

- 32. The following data give the weekly wages of 100 workers in a factory :

Weekly wages :	20 – 24	25 – 29	30 – 34	35 – 39	40 – 44	45 – 49	50 – 54	55 – 59	60 – 64
No. of workers :	4	5	12	23	31	10	8	5	2

Draw less than ogive and hence find the value of median. Also verify your answer by median formula.

- 33. The table below gives the distribution by size (no. of works employed) of 40 different companies.

No. of workers	: 1 – 50	51 – 100	101 – 150	151 – 200	201 – 250	251 – 300	301 – 350
No. of companies	: 13	9	0	7	4	5	2

Calculate :

- a) The total number of persons employed in these 40 companies.
- b) The standard deviation.
- c) Coefficient of variation.



34. Find Karl Pearsons coefficient of correlation from the following data :

Wages :	100	101	102	102	100	99	97	98	96	95
Cost of living :	98	99	99	97	95	92	95	94	90	91

35. Given the two equations for the regression lines

$$8x - 10y + 66 = 0$$

$$40x - 18y - 214 = 0$$

- i) Identify the regression lines of Y on X and X on Y.
- ii) Obtain the regression coefficients and the correlation coefficient.
- iii) Find the mean of X and the mean of Y.
- iv) Given the standard deviation of X = 4, find the standard deviation of Y.

(2×15=30)
