

Bachelor of Science (B.Sc.) Semester-II Examination
STATISTICS (DESCRIPTIVE STATISTICS—II)
Optional Paper—2

Time : Three Hours]

[Maximum Marks : 50

N.B. :— ALL questions are compulsory and carry equal marks.

1. (A) Define arithmetic mean, geometric mean and harmonic mean. Also, give their formulae for grouped frequency distribution. Give situations where each of the means are appropriate averages. Also derive the formula for pooled geometric mean of two groups of values.

10

OR

- (E) For grouped frequency distribution, derive the formula for median and mode. Also, explain how median can be obtained graphically.

10

2. (A) What are the desirable properties of a measure of dispersion ?
 (B) Prove that root mean square deviation can never be less than standard deviation.
 (C) Derive the formula for pooled variance of two groups of values.
 (D) Define coefficient of variation and explain its use.

2.5×4=10

OR

- (E) Define mean deviation and quartile deviation. Show that mean deviation is the least when measured from median. Also state the formula of mean deviation from an average A in case of a grouped frequency distribution. Give two situations where quartile deviation is more suitable than mean deviation as a measure of dispersion.
 (F) Derive the relationship between raw moments and central moments. Hence, state the formulae for first four central moments.

5+5

3. (A) Define quartiles, deciles and percentiles. In case of grouped frequency distribution explain how quartiles can be obtained graphically. Also, state its formula.
 (B) What is meant by skewness ? Give the properties of a good measure of Skewness. Explain the three coefficients of Skewness.

5+5

OR

- (E) Write a short note on Kurtosis of a frequency distribution.
 (F) Explain Skewness with the help of different sketches of frequency curve and also with the help of a box plot.

5+5

4. (A) Define Kendall's rank correlation coefficient. Show that it is a product moment correlation coefficient.
 (B) Derive the equation to the line of regression of Y on X. Show that coefficient of determination is equal to the proportion of total variability that is explained by linear regression.

5+5

OR

- (E) Define Spearman's rank correlation coefficient. Obtain its limits when there is no tie.
 (F) What is a scatter plot ? Explain its use. Define correlation coefficient and obtain its limits.

5+5

5. Solve any **TEN** of the following questions :
- (A) State empirical relation between mean, mode and median.
 - (B) Give the formula for weighted arithmetic mean.
 - (C) How will the harmonic mean of a set of observations change if each observation is multiplied by constant K ?
 - (D) For a perfectly symmetrical distribution, if the semi-interquartile range is 26 and median is 78, find the lower and upper quartiles.
 - (E) Define root mean square deviation.
 - (F) Explain the use of third central moment.
 - (G) Explain the need of Sheppard's correction for moments.
 - (H) Which decile, quartile and percentile are equal ?
 - (I) Define Karl Pearson's Coefficient of Skewness.
 - (J) Derive the limits for Bowley's Coefficient of Skewness.
 - (K) Give a real life example of negatively correlated variables.
 - (L) Can the slopes of two regression lines be opposite in sign ? Justify your answer.

1×10=10