

Bachelor of Science (B.Sc.) Semester—II (C.B.S.) Examination**STATISTICS (Descriptive Statistics—II)****Compulsory Paper—2**

Time : Three Hours]

[Maximum Marks : 50

Note :— All questions are compulsory and carry equal marks.

1. (A) Define mean, median and mode. State the drawbacks of each of them. Give practical situations where each of the above measures of central tendency can be most appropriately used. 10

OR

- (E) Explain the effect of change of origin and scale on mean. Also, derive the formula for median and mode to be used in a grouped frequency distribution. 10

2. (A) Define standard deviation. State its merits and demerits.
 (B) Show that mean deviation about mean is independent of change of origin but not of scale.
 (C) Explain Sheppard's correction for moments of grouped data.
 (D) For ungrouped data, show that standard deviation is not less than mean deviation from mean. $2.5 \times 4 = 10$

OR

- (E) Define raw and central moments of order r . Derive an expression for r^{th} central moment in terms of raw moments. Hence, state the formulae for the second, third and fourth central moments.

- (F) Define variance. Derive the formula for pooled variance of two sets of observations. State its extension for n sets. 5+5

3. (A) Define quartiles. Explain how different quartiles are obtained for grouped frequency distribution using formulae and cumulative frequency diagram of less than type.
 (B) Write a short note on Kurtosis. 5+5

OR

- (E) Explain the construction and use of Box-plot.
 (F) What is meant by skewness ? Explain symmetry and skewness with the help of graphs. Define various measures of skewness and explain their use in studying the skewness. 5+5

4. (A) Explain the use of rank correlation. Derive the formula for Spearman's rank correlation in case of no tie.
 (B) Define correlation coefficient and regression coefficients. State relationship between them. Prove that if one regression coefficient is greater than unity, other must be less than unity. 5+5

OR

- (E) Derive the expression for line of best fit of Y on X by the method of least squares. Explain effect of change of origin and scale on regression coefficients. 10

5. Solve any **TEN** of the following

- (A) Compute arithmetic mean of first n natural numbers.
- (B) Give the formula for weighted arithmetic mean.
- (C) For a moderately asymmetrical distribution mean and median are 26 and 24 respectively, then find approximate value of mode.
- (D) Define range and give its main drawback.
- (E) Define quartile deviation and a measure of relative dispersion based on quartiles.
- (F) State the formula for D_j .
- (G) Define coefficient of variation.
- (H) If (i^{th} quartile) = (j^{th} decile) = (k^{th} percentile) then what are the values of i , j and k ?
- (I) State the formula for 67th percentile of a grouped frequency distribution.
- (J) Define Kendall's τ .
- (K) If $r_{xy} = 0.8$ and $u = \frac{x - 10}{4}$, $v = \frac{8 - y}{5}$. State the value of r_{uv} .
- (L) Define coefficient of determination. 1×10=10