Bachelor of Science (B.Sc.) Semester—II (C.B.S.) Examination

STATISTICS (Descriptive Statistics–II)

Compulsory Paper–2

Time : Three Hours]   [Maximum Marks : 50

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

1. (A) Define (i) Mean (ii) Median (iii) Mode for a set of observations corresponding to each of the above measures. Suggest a real life situation where its use is appropriate.

Let $\bar{X}$, Me and Mo denote the mean, median and mode of the set of observations $(x_1, x_2, ... x_n)$. If $ui = a + hxi$, $i = 1, 2, ..., n$ where a and h are positive constants then find the mean, median and mode of u-values.   10

OR

(E) Define mode of a frequency distribution. Derive the formula for mode of a grouped frequency distribution. State merits and demerits of mode as a measure of Central Tendency.

(F) State merits and demerits of median as a measure of central tendency. In a set of 5 values arranged in increasing order, 3 is the smallest value. If n^{th} observation is multiplied by $(-1)^n$ for all $n = 1, 2, 3, 4, 5$ then what is the median of the new set of values ?   5+5

2. (A) Derive an expression for pooled variance of two series of sizes n_1 and n_2 respectively.

(B) Define Mean Deviation about an average A for a set of observations and state its merits and demerits.

(C) Explain the effect of change of origin and scale on central moments.

(D) Define coefficient of dispersion. State its utility. Also, state the formulae for coefficient of dispersion based on various measures of dispersion.   2.5×4

OR

(E) What is meant by dispersion of a set of observations ? Discuss various measures of dispersion giving their merits and demerits.   10

3. (A) Define quantities of a frequency distribution. Explain how they can be graphically located. Also explain their use to study the skewness of the frequency distribution. Define a coefficient of skewness based on quartiles. Derive its limits.   10

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 Spearman's Rank Correlation Coefficient. Derive an expression for the rank correlation coefficient in case of no tie. Establish the limits for Spearman's Rank Correlation Coefficient.

10

OR

(E) Derive the equation to the line of regression of Y on X. Prove that correlation coefficient is the geometric mean of regression coefficients. Also prove that both the regression coefficients can not be numerically greater than unity. Does uncorrelation mean that the variables are independent ? Justify your answer. 10

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

(A) If the mean of deviations of a set of observations from A is B. What is the mean of the set of observations ?

(B) For a moderately asymmetrical distribution mean and median are 26 and 24 respectively, then find approximate value of mode.

(C) When will the weighted mean be same as unweighted mean ?

(D) If $\mu_r'(A)$ denotes r^{th} moment about A for a frequency distribution and $\mu_1'(2) = 3$, $\mu_2'(0) = 29$ find standard deviation for this distribution.

(E) Write the formula for second central moment when Sheppard's correction is used.

(F) Explain the need of Sheppard's correction for moments.

(G) State the formula for 67th percentile of a grouped frequency distribution.

(H) Write how a box plot for a given data, can be constructed.

(I) If $2X - 3Y = 7$ and $5X - 4Y = 2$ are two least square regression equations, find mean of X.

(J) Identify the line of regression of Y on X from the equations given in question 5(I).

(K) What rank will be given to the seven individual items between 7th and 15th ranks if each of them has the same score ?

(L) Name the graph which is used to find partition values graphically. $1 \times 10 = 10$