

B.Sc. (Honours) Examination, 2018
Semester-I
Statistics
Course : BSC-12
(Descriptive Statistics)
(Back Candidates Only)

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer **any four** questions from the following

1. (a) Distinguish between (i) Frequency density and relative frequency, (ii) Class limits and class boundaries.
(b) The class marks of a frequency distribution are 5, 10, 15, 20 and 25 respectively. Obtain the class boundaries of the respective classes.
(c) State and prove Cauchy-Schwartz inequality in case of two discrete series of observations x_1, x_2, \dots, x_n and y_1, y_2, \dots, y_n . 4+3+3=10
2. (a) Derive the formula for the median from the p th order **Quantile** of a frequency distribution. Based on **Quartiles**, provide a measure of dispersion.
(b) Define arithmetic mean of a set of observations. How to combine the means of a number of sets of observations? Justify your answer. 5+5=10
3. (a) Prove that for a set of positive observations $A \geq G \geq H$. Discuss a situation when we have $AG = G^2$, where the notations have their usual meaning.
(b) For any set of n observations, prove that
$$\frac{R^2}{2n} \leq s^2 \leq \frac{R^2}{4},$$
 5+5=10
where the notations have their usual meaning.
4. (a) Show that mean square deviation is least when measured about the arithmetic mean.
(b) Show that the mean deviation is least when measured about the median. 5+5=10
5. (a) Define moments. Prove that all odd ordered central moments are zero for a symmetric distribution.
(b) Define Skewness and Kurtosis of a frequency distribution. Prove that $b_2 \geq b_1 + 1$, where the notations have their usual meaning. 5+5=10

P.T.O.

(2)

6. (a) Define correlation coefficient. Show that it lies between -1 and +1. What will be your comment when $r = \pm 1$? Justify your comment.
- (b) Discuss the notion of regression analysis. Derive the linear regression equation of y on x .

5+5=10
