

**B.Sc. (Honours) Examination, 2018**  
**Semester-I**  
**Statistics**  
**Course : CC-1A**  
**(Descriptive Statistics)**

**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

$$\frac{R^2}{2n} \leq s^2 \leq \frac{R^2}{4}, \quad \text{5+5=10}$$

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

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(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

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