UNIVERSITY OF NORTH BENGAL

B.Sc. Programme 1st Semester Examination, 2020

DSC1-STATISTICS

DESCRIPTIVE STATISTICS

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.
All symbols are of usual significance.

GROUP-A

1. Answer ***all*** the question: 2×4 = 8

   (a) Define Rank Correlation.

   (b) Calculate the coefficient of variation where Pearson's measure of Skewness = 0.42; Arithmetic mean = 86, Median = 80.

   (c) Find the first four moments about the mean.

   (d) The arithmetic mean of two observations is 25 and their geometric mean is 15. Find their harmonic mean.

GROUP-B

Answer any *four* questions 8×4 = 32

2. (a) Show that, mean deviation about mean cannot exceed the standard deviation. 4

   (b) Prove the correlation coefficient does not depend on the origin or scale of the observations. 4

3. (a) If three uncorrelated variables x_1, x_2 and x_3 have the same standard deviation, find the coefficient of correlation between $x_1 + x_2$ and $x_2 + x_3$. 3

   (b) Show that, for a given set of observations the sum of the squares of deviation will be minimum when the deviation are taken from the arithmetic mean. 5

4. (a) What do you mean by Kurtosis? 2

   (b) Deduce Spearman's formula for rank correlation coefficient. 6

5. (a) n pairs of values of two variables x and y are given. The variances of x, y and $x-y$ are s_x^2, s_y^2 and s_{x-y}^2 respectively. Show that correlation coefficient r_{xy} between x and y is given by 3

$$\frac{s_x^2 + s_y^2 - s_{x-y}^2}{2s_x s_y}$$

(b) Prove that, $\beta_2 - \beta_1 - 1 \geq 0$, where β_1 and β_2 have usual meanings. 5

6. (a) Show that, standard deviation calculated from two variables x_1 and x_2 of a variable is equal to half their difference. 4

(b) Prove that correlation coefficient lies between -1 to $+1$. 4

7. (a) Prove that, all odd order central moments are zero for symmetric distribution. 5

(b) Derive the regression equation of x on y. 3

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