



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL
B.Sc. Programme 1st Semester Examination, 2021

DSC1/2/3-P1-STATISTICS

DESCRIPTIVE STATISTICS

Time Allotted: 2 Hours

Full Marks: 40

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

GROUP-A

1. Answer any **five** questions from the following: 1×5 = 5
- (a) Distinguish between primary and secondary data.
 - (b) What is ogive?
 - (c) What do you mean by mean deviation about mean?
 - (d) What is scatter diagram?
 - (e) Calculate arithmetic mean of the first n natural numbers.
 - (f) What is skewness?
 - (g) Write the three different types of kurtosis.
 - (h) What do you mean by rank?

GROUP-B

2. Answer any **three** questions from the following: 5×3 = 15
- (a) Prove that all odd order central moments are zero for symmetric distribution.
 - (b) Prove that correlation co-efficient does not depend on the origin or scale of the distribution.
 - (c) The means and sds of two samples of sizes n_1 and n_2 are \bar{x}_1 , \bar{x}_2 and s_1 , s_2 respectively. Show that the sd of the composite sample is given by
$$s^2 = \frac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2} + \frac{n_1 n_2 (\bar{x}_1 - \bar{x}_2)^2}{(n_1 + n_2)^2}.$$
 - (d) Prove that $\frac{m_4}{m_2^2} \geq \frac{m_3^2}{m_2^3}$, where the symbols have their usual meanings.
 - (e) Prove that the correlation coefficient is the geometric mean of the two regression co-efficients.

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20

- (a) What do you mean by regression coefficients of y on x ? Prove that the angle θ between the two regression lines is given by

$$\theta = \tan^{-1} \left(\frac{1-r^2}{r} \cdot \frac{s_x s_y}{s_x^2 + s_y^2} \right)$$

where the symbols have their usual meanings.

- (b) What is r th order moment about an arbitrary origin A ? Establish the relation between central and raw moments. Write the expressions for the first four central moments in terms of raw moments.
- (c) The two regression equations are $8x - 10y + 66 = 0$ and $40x - 18y = 214$. Also sd of x is 3. Find (i) the average value of x and y . (ii) correlation coefficient between two variables (iii) sd of y .
- (d) What do you mean by rank correlation? Prove that $R = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$, where the symbols have their usual meanings.

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