



'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL
B.Sc. Programme 1st Semester Examination, 2022

DSC1/2/3-P1-STATISTICS

DESCRIPTIVE STATISTICS

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

1. Answer any **five** questions from the following: 1×5 = 5
- (a) Calculate geometric mean of the following series:
 $1, 3, 9, 27, \dots, 3^n$
- (b) What is skewness?
- (c) Calculate arithmetic mean of the first n natural numbers.
- (d) What is Ogive?
- (e) What do you mean by measure of dispersion?
- (f) What do you mean by mean deviation?
- (g) State the merits and demerits of median.
- (h) Distinguish between Primary data and Secondary data.

GROUP-B

2. Answer any **three** questions from the following: 5×3 = 15
- (a) Show that the correlation coefficient lies between -1 and $+1$.
- (b) A group of 100 items has mean 60 and variance 25. If the mean of the 1st 50 items is 61 and S.D is 4.5, find the mean and S.D of the other 50 items.
- (c) Prove that all odd ordered central moments are zero for symmetric distribution.
- (d) What are central moments? Establish the relation between central and raw moments. What are the expressions for the first four central moments in term of raw moments?
- (e) Prove that correlation coefficient is the geometric mean between the two regression coefficients.

GROUP-C

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

(a) (i) Find the standard deviation of the first n natural number.

(ii) Prove that $\frac{m_4}{m_2} \geq \frac{m_3^2}{m_2^2} + 1$, where the symbols have their usual meanings.

(b) You are given that the variance of x is 9. The regression equations are $8x - 10y + 66 = 0$ and $40x - 18y = 214$. Find the

- (i) average values of x and y ,
- (ii) correlation coefficient between the two variables, and
- (iii) standard deviation of y .

(c) What do you mean by regression coefficients of x on y ? 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.

(d) What do you mean by rank and 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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