



'সমানো মন্ত্র: সমিতি: সমানী'

**UNIVERSITY OF NORTH BENGAL**

B.Sc. Honours 3rd Semester [Special] Examination, 2022

**GE2-P1-STATISTICS**

**STATISTICAL METHODS**

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) What is ogive?
  - (b) What do you mean by frequency distribution?
  - (c) Calculate the mean of the 1st  $n$  natural number.
  - (d) What is the expression of mean deviation about median?
  - (e) What is skewness?
  - (f) What is primary data?
  - (g) What is statistics?

**GROUP-B**

2. Answer any **three** of the following: 5×3 = 15
- (a) Prove that  $-1 \leq r \leq 1$ .
  - (b) The mean and SD of a group of 100 observations are 6.5 and 2 respectively. 55 of these observations have mean 6.6 and SD 1.5. Find the mean and SD of the remaining 45 observations.
  - (c) Find the mean and median of the following data.

Marks	0-20	21-30	31-40	41-50	51-60	61-70	71-80
No. of students	21	19	60	42	24	18	15

- (d) Prove that all odd order central moments for symmetric distribution in zero.
- (e) Prove that correlation coefficient is the geometric mean of the coefficient of regression.

**GROUP-C**

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

- (a) (i) What is rank correlation? Deduce Spearman's rank correlation coefficient.  
 (ii) Prove that  $\beta_2 \geq \beta_1 + 1$ .
- (b) What do you mean by regression coefficients of  $x$  on  $y$  ? Out of two regression lines given by  $x + 2y = 5$  and  $2x + 3y = 8$  .  
 Which one is the regression line of  $x$  on  $y$  ? Find also the values of  $\bar{x}$ ,  $\bar{y}$ ,  $r$  and  $\sigma_y$  given  $\sigma_x = 12$  .
- (c) What is central moment? Establish the relation between central and raw moment. What are the expressions for the first four central moments in terms of raw moments?
- (d) (i)  $X$  and  $Y$  are two variables with SDs  $s_x$  and  $s_y$  respectively. They have positive correlation  $r$  . Find the value of  $k$  such that  $X + kY$  and  $X + \frac{s_x}{s_y} Y$  are uncorrelated.  
 (ii) Prove that  $\beta_2 \geq \beta_1$  .

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