

Sylhet Cadet College
Half-Yearly Examination - 2023
Class: XI

Subject: Statistics First Paper (Creative) Set: A

Justify text to right

Time: 2 hour & 10 minutes

Subject Code: 129

Full Marks: 50

N:B: Read the questions carefully and answer the associated questions correctly. Answer any FIVE questions. Figures in the right indicate full marks.

1. An analyst obtains some data:

$$x_1 = 15, x_2 = -12, x_3 = 17, x_4 = 11, x_5 = 23$$

- (a) What is sample? 1
- (b) Briefly explain shift or origin and scale. 2
- (c) Compute the value of $\sum_{i=1}^5 (x_i - 10)^2$ 3
- (d) Find the value of $\sum_{i=1}^5 (5x_i^2 - 4x_i - 3)$ and examine its dependency on origin and scale. 4

2. A departmental store records their sales. An analysis of products with prices less than tk. 30 generates the following table.

Price	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	1	0	2	3	8	12

- (a) What is relative frequency? 1
- (b) If $Y = a + bX$, $\bar{Y} = ?$ 2
- (c) Find 67th Percentile and 3rd Quartile and explain. 3
- (d) Is AM or Median more suitable for this data? Elucidate. 4

3. A cyclist moves around a square-shaped lake with the speeds 20, 25, 30, and 16 km per hour.

- (a) What is grouped data? 1
- (b) Is arithmetic mean suitable for this data? 2
- (c) Find the average speed of the cyclist. 3
- (d) Can we use some other formula for finding the average? Demonstrate. 4

4. There has been an increase in average lifetime of people of Bangladesh. To get more insight on this, a research was conducted, in which ages of retired government employees were recorded. A sample of 10 people is given below:

$$75, 62, 63, 72, 66, 76, 59, 77, 70, 79$$

- (a) What is the 2nd central moment? 1
- (b) Show that the first central moment is zero. 2
- (c) Find the variance of the data. 3
- (d) Are the data symmetric? Justify. 4

5. The first four moments about 3 of a distribution are -1, 5, -10, and 120.

- (a) What are moments used for? 1
- (b) Can the second central moment be greater than the third central moment? 2
- (c) Find the second and third moments about arithmetic mean of the distribution. 3
- (d) Find skewness and kurtosis and comment on the values. 4

6. Annual sales of company are as given in the following

Year	2010	2011	2012	2013	2014	2015	2016
Profit (million)	40	45	46	53	65	70	73

- (a) What is a trend? 1
- (b) Do the data in the stem seem to have a trend? 2
- (c) Find the trend using semi-average method. 3
- (d) Find the trend using 2-yearly moving average method. Would it better if we used 3-yearly method? 4