

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

**Subject: Statistics First Paper (Creative) Set: A**

**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. In the test examination, marks of 11 students in statistics are: 90, 92, 93, 49, 44, 88, 80, 58, 83, 71, 76.**

- (a) What is central tendency? 1
- (b) When is median better than arithmetic mean? Explain with an example. 2
- (c) Find the 3rd the quartile and 61st percentile from the data and explain. 3
- (d) Do quantiles depend on change of origin and scale. Prove using two examples. 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

**7. Every country has one or more agencies to deal with statistics of the country for proper management of its assets and population. Bangladesh Bureau of Statistics (BBS) serves as the centralized official bureau in Bangladesh for collecting and disseminating statistics in Bangladesh. USA has several such agencies, like Census Bureau or Bureau of Labor Statistics.**

- (a) What is data? 1
- (b) How is statistics important in planning? 2
- (c) Differentiate between official and non-official statistics. 3
- (d) Elucidate the classification of published statistics in Bangladesh. 4