

**Sylhet Cadet College**  
**Model Test Examination - 2022**

**Class: HSC**

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

**Time: 1 hour & 40 minutes**

**Subject Code: 129**

**Full Marks: 30**

Answer three questions taking at least 1 (one) from each group. Figures in the right indicate full marks.

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**Group A**

**1. Call duration of 6 calls in a customer care center are**

2, 2.5, 1.5, 5, 6, 3

- (a) What is a sample? 1
- (b) Are all quantitative variables continuous? 2
- (c) Determine  $\sum_{i=1}^7 (x_i - 3)^3$  3
- (d) Find the values of  $\sum_{i=1}^7 (x_i - 5)^2$  and  $\sum_{i=1}^7 x_i^2 + 5$ . 4  
Explain mathematically why they are unequal.

**2. Scores of a batsman in the last 20 innings are**

28, 30, 16, 48, 50, 86, 105, 20, 10, 36,  
12, 25, 20, 35, 65, 12, 10, 76, 55, 32

- (a) Write down the formula of weighted harmonic mean 1
- (b) Can median be a better measure of central tendency than arithmetic mean for this data? 2
- (c) Draw a stem and leaf plot from the data and explain. 3
- (d) Make a frequency distribution from the data and also find and interpret cumulative frequencies and percentages. 4

**3. Frequency distribution of marks in statistics of a college is given in the following table.**

Marks	Number of Students	Number of Students
	Group - A	Group - B
25-30	11	10
30-35	18	16
35-40	21	22
40-45	26	28
45-50	14	9

- (a) What is data? 1
- (b) What are the disadvantages of secondary data? 2
- (c) Calculate the arithmetic mean of Group - A 3
- (d) Compute the combined mean. Is it greater than the arithmetic mean of Group - B? Explain the possible reason(s). 4

**4. In the test examination, marks of 10 students in statistics are**

69, 85, 77, 66, 92, 42, 97, 53, 83, 81.

- (a) What is central tendency? 1
- (b) When is median better than arithmetic mean? Explain with an example. 2
- (c) Find the 63rd percentile from the data and explain. 3
- (d) Below which mark lie marks of 70% students? Find using two separate quantiles. 4

## Group B

### 5. Marks obtained by a student in 7 subjects are

70, 66, 55, 45, 80, 30, 82

- (a) What is negative skewness? 1
- (b) Draw graphs of positive and negative skewness showing the locations of mean and median. 2
- (c) Determine the five number summary from the stem and explain. 3
- (d) Are the data symmetric? If not, comment on the pattern of data. 4

### 6. Income of a freelancer in 6 successive months (from Jan to Jun) was found to be 46.0, 49.5, 51.5, 50.6, 56.5, and 60 (in thousands BDT.).

- (a) What is time series data? 1
- (b) What are the components of a time series model? 2
- (c) Determine the 3-monthly moving average from the data. 3
- (d) Draw the moving averages on a graph paper and interpret. 4

### 7. In a distribution, $\bar{X} = 70$ , $Me = 75$ , $Q_1 = 40$ , $Q_3 = 63$ , $\sigma = 2$ , and $\mu_3 = 5.77$ .

- (a) What is skewness? 1
- (b) Can the second central moments be negative? 2
- (c) Find the skewness with Bowley's formula from the data and explain. 3
- (d) Estimate the skewness using the method of moment. Does it comply with Bowley's estimate? 4

### 8. 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