

[N.B. – The figures of the right margin indicate full marks. Read the stems carefully and answer the associated questions. Answer any **FIVE** questions taking at least two from each group.]

Group–A

1. Marks of 10 students in Statistics in a class were found to be the following:

99, 88, 98, 85, 97, 71, 87, 79, 70, 84

Later it was discovered that all marks should be 5 less than the recorded marks.

- (a) What is change of origin? 1
- (b) Does summation of a variable depend an change of origin? 2
- (c) Considering the data in stem as X, find $\sum_{i=1}^{10} X_i$ and $\sum_{i=1}^{10} X_i + 3$ 3
- (d) Find the arithmetic mean of the corrected values, employing the concept of shift of origin. 4

2. Goals scored by a footballer in 25 matches are summarized as shown below.

Goals	0	1	2	3	4
Times	8	9	5	2	1

- (a) Is no. goals a discrete or continuous variable? 1
 - (b) Verify theoretically: $\sum_{i=2}^2 X_i Y_i = \sum_{i=1}^2 X_i \times \sum_{i=1}^2 Y_i$ 2
 - (c) Find the total number of goals using a suitable notation. 3
 - (d) If he scores two (2) goals in the next match, will the scoring rate increase? 4
3. Scores by Travis Head in the last two matches of ICC Men’s Cricect World - 2023 are given. In Cricket, Strike Rate (SR) is computed by dividing Balls by Runs and then multiplying the quotient by 100.

Match	Runs	Balls
1	62	48
2	137	120

- (a) How many averages do you know of? 1
 - (b) Give an example when arithmetic mean is appropriate instead of harmonic mean. 2
 - (c) When is Weighted Harmonic mean is used. Show a numerical example. 3
 - (d) Determine the average Strike Rate of the batter 4
4. Average height of the four tallest towers in Dhaka is 153.25 meters. The heights of first three towers is 171, 153 and 152 meters, respectively. A new tower has been built with height 150 meters.
- (a) Write two primary uses of central tendency. 1
 - (b) Prove mathematically: $\sum_{i=1}^n (x_i - \bar{x}) = 0$ 2
 - (c) Compute the height of the forth tower. 3
 - (d) After the addition of the new tower, will the average increase or decrease? Explain logically and empirically (using data). 4

Group–B

5. Duration of stays of a spy in foreign countries are obtained by a researcher. As part of an analysis, s/he starts with the following summary.

- (a) What is symmetry? 1
- (b) What is implied by the value of coefficient of skewness 0.8 2
- (c) Estimate the median of the data and interpret. 3
- (d) Obtain coefficient of skewness from data and comment on the life of the spy based on it. 4

Absence of evidence is not evidence of absence. – Carl Sagan

Duration	1-10	11-20	21-30	31-40	41-50	51-60
Frequency	4	3	3	2	5	2