SYLHET CADET COLLEGE

FIRST TERM-END EXAMINATION - 2023 | Set | A |
CLASS: XI
STATISTICS (CREATIVE) **Subject Code:** | 1 | 2 | 9 |
FIRST PAPER
TIME – 2 hours & 35 minutes
FULL MARKS – 50

[**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 Cricekt 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

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

(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

6. **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

7. **Average monthly temperatures (in ^oC) in the city of Sylhet are collected by an analyst. The analyst assumes the next month will not follow the current trend.**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul
Temperature	25.2	27.1	30.4	30.8	30.9	30.9	31.6

(a) What is seasonal variation? 1

(b) Differentiate between seasonal variation and cyclic variation. 2

(c) Find the general trend using semi-average method. 3

(d) Find the trend using moving average method and examine the assumption of the analyst. [the genuine next value is 31.2] 4

8. **In 2015, tens of thousands of Rohingya people were forcibly displaced from their villages and IDP camps in Rakhine state, Mynmar. Many of them fled to neighboring countries, including Bangladesh, Malaysia, Indonesia. Many national and internations agencies collect data on the issue.**

(a) What is non-official statistics? 1

(b) Name five sources of official statistics. 2

(c) Shed some light on the limitations of official statistics. 3

(d) How can the quality of published statistics in Bangladesh be improved? 4

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