Sylhet Cadet College
Pre-Test Examination - 2022
Class: XII
Set - B
Subject: Statistics First Paper (Creative)
Time: 2 hour & 35 minutes   **Subject Code: 129**   **Full Marks: 30**

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

Group A

1. **Mean monthly salaries of employees of two companies A & B are tk. 65,000 and tk. 75,000. The combined arithmetic mean (AM) is tk. 71,000 and number of employees in the company A is 20.**

    (a) Write down the formula of combined AM for k groups.   1

    (b) What is the combined AM of two data sets with AM 35 and 45 and number of values equal?   2

    (c) How many employees are there in the company B?   3

    (d) Salary of an employee of company A was recorded as tk. 60,000 in place of 65,000. What is the new AM of company A. Also find the corrected combined AM.   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. **Arithmetic and Harmonic Mean (HM) of two numbers are 25 and 9, respectively.**

    (a) When is HM useful?   1

    (b) Derive HM formula using the concept of average velocity.   2

    (c) Find the two values from the stem.   3

    (d) Show mathematically that $HM \leq AM$ (for n=2)   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) Why is the first central moment zero?   2

    (c) Find the variance of the data.   3

    (d) Are the data symmetric? Justify.   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) Analyze symmetry of the data by drawing the box plot. 4

6. **Given below is a series of data.**

$$5, 7, 9, \cdots, 123$$

(a) What is the summation of natural numbers up to nth value? 1

(b) Find the arithmetic mean of natural numbers from 1 up to 20. 2

(c) Find the arithmetic mean of the given series. 3

(d) Prove that arithmetic mean is greater than gemetric mean theoretically and empricially. 4

7. **The yearly revenue (in hundred thousand) of shoe manufacturer company is given below**

Year	2005	2006	2007	2008	2009	2010	2011
Revenue	35	22	40	35	50	42	60

(a) What is general trend? 1

(b) Which method of determining trend gives only two values? 2

(c) Determine the trend using three-yearly moving average method. 3

(d) Find the trend using graphical method and extrapolate the approximate revenue earned in 2012. 4

8. **A farmer in Dinajpur district produces seasonal crops. First four moments around 9 of his daily earnings are computed as -1, 8, -16, and 25.**

(a) What is the Box and Whisker plot? 1

(b) Can Box and Whisker plot suggest symmetry? 2

(c) Find the arithmetic mean and variance of the farmer's earnings. 3

(d) Do the earnings produce a symmetric data? Analyze. 4