Sylhet Cadet College

First Term-End Examination - 2023

Class: XI

Subject: Statistics First Paper (Creative)

Time: 2 hour & 35 minutes **Subject Code: 129** **Full Marks: 50**

Answer FIVE questions taking at least two (2) from each group. Figures in the right indicate full marks.

Group A

1. **Height (in inches) of 10 cadets in a class are: 50, 60, 55, 65, 66, 70, 54, 64, 62, 72**

   (a) What is population in statistics? 1

   (b) Is height discrete or continuous? 2

   (c) Find $\sum_{i=1}^{10} x_i^2$ 3

   (d) Find the square of mean and mean of square. Are they equal? 4

2. **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

3. **Hourly wages of 100 workers in an idustry were collected by a market analyst. The analyst desires to mine a patter and useful insights from the collected data about the industry. The obtained data are demonstrated below:**

Wage	51-55	56-60	61-65	66-70	71-75	76-80	81-85
Number of workers	7	11	18	36	15	8	5

   (a) What is class interval? 1

   (b) How does a frequency distribution help us to find patter in data? 2

   (c) Draw an Ogive from the data provided and explain. 3

   (d) Write five useful insights about the data combining information from Ogive and the table. 4

4. **For two non-zero positive numbers, $GM = 4\sqrt{3}$ and $HM = 6$, where the quantities bear usual notations**

   (a) When is Harmonic mean suitable? 1

   (b) For two numbers, what is the relationship between AM, GM, and HM? 2

   (c) What is the Arithmetic mean? 3

   (d) Determine the numbers. 4

Group B

5. **12 is deducted from each value of a variable and then divided by 3. The new arithmetic mean (AM) is found to be 4.**

   (a) What is change of origin? 1

   (b) Does AM depend on origin? Prove with an example. 2

   (c) From the stem, find the original AM. 3

   (d) Does the origin or the scale have greater impact on AM in this example? 4

6. **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

7. **Two companies A and B pay their workers on a weekly basis. The summary of wages paid by them is shown below:**

Factory	Wage (BDT)	Standard Deviation	Number of workers
A	1560	90	200
B	1580	70	160

(a) What is dispersion? 1

(b) Is variance always greater than stanard deviation? Justify. 2

(c) Which company is more consistent with their wages? 3

(d) Find the combined Coefficient of Variance (CV) and compare with individual companies. 4

8. **Mean and Standard Deviation of 200 items are found to be 60 and 20. Later it was found that two items were recorded as 3 and 67 in place of 13 and 17.**

(a) Does standard deviation depend on change of origin? 1

(b) Prove $\sigma^2 = \frac{\sum x^2}{n} - (\frac{\sum x}{n})^2$ from original formula. 2

(c) Should the correct mean be smaller or greater? Also find it and compare. 3

(d) Find the correct standard deviation. 4