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MYMENSINGH GIRLS' CADET COLLEGE
PRETEST EXAMINATION - 2025
CLASS: XII
STATISTICS (CREATIVE)
FIRST PAPER
[According to the Syllabus of 2026]
TIME – 2 hours & 35 minutes
FULL MARKS – 50

Subject Code: | **1** | **2** | 9 |

[**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 questions from each group]

Group - A

1. **A nutritionist is analyzing the daily protein intake (in grams) of five athletes. The recorded values are:**

$$x_1 = 55, \quad x_2 = 60, \quad x_3 = 48, \quad x_4 = 62, \quad x_5 = 50$$

(a) What is bivariate data? 1

(b) If the ages of a group of people are 22, 25, 28, 30, and 35, find $\sum_{i=1}^{5}(x_i^2 + 3x_i)$ 2

(c) Compute the value of $\sum_{i=1}^{5}(x_i - 52)^2$ from the stem. 3

(d) Calculate $\sum_{i=1}^{5}(x_i^2 - 4x_i + 10)$ using both direct evaluation and by separating the summation terms. 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. **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

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

Factory	Mean 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) Compare the wages with variance alone. Does it produce the same conclusion. Justify the finding. 4

Group - B

5. **A researcher wants to compare average life time of people in Bangladesh and other countries. He collected life time of 10 people in Bangladesh.**

75, 62, 63, 72, 66, 76, 59, 77, 70, 79

(a) What is symmetry? 1

(b) Mathematically show the theoretical value of the first central moment. 2

(c) Compute the 2nd, 3rd, and 4th central moments of the data. 3

(d) Estimate skewness and kurtosis and explain. 4

6. **The first four moments about 3 of a distribution are -1, 5, -10, and 120.**

(a) What are moments used for? 1

(b) Can the second central moment be greater than the third central moment? 2

(c) Find the second and third moments about arithmetic mean of the distribution. 3

(d) Find skewness and kurtosis and comment on the values. 4

7. **The following table shows the monthly sales (in thousand) of 8 salespeople and their years of experience. It is hypothesized that sales performance depends on experience.**

Experience (X, years)	1	2	3	4	5	6	7	8
Sales (Y, thousand)	25	32	38	45	50	58	63	70

(a) What is correlation? 1

(b) Write two purposes of regression analysis. 2

(c) Estimate and interpret the regression coefficient of y on x. 3

(d) Estimate the regression coefficient of x on y. Is this model realistic? Explain. 4

8. **The monthly sales (in thousands of units) of a product for the last 6 months are given below:**

Month	January	February	March	April	May	June
Sales	80	95	110	105	120	115

(a) What is irregular variation? 1

(b) How is moving average method used? 2

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

(d) Plot the trend and forecast the sales for July using two methods and compare. 4

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Group - A

1. **Marks obtained by five students in statisics out of 15 were 4, 6, 10, 12, and 15. The examiner said, the square of the sum of the marks is greater than the sum of the squares of the marks.**

   (a) What is finite population? 1

   (b) Explain quantitative variable with an example. 2

   (c) In the light of the available data, find $\sum_{i=1}^{5}(x_i - 2x_i)^2$ 3

   (d) Verify the comment of the examiner. 4

2. **A sports analyst collected ages of athelets having ages between 10 and 35. He then presented his findings as below:**

Age	10-15	15-20	20-25	25-30	30-35
No. of Athlete	2	8	10	5	3

   (a) What is central tendency? 1

   (b) When is geometric mean iappropriate to measure? 2

   (c) Compute median from the stem. 3

   (d) Show that Arithmetic mean is greater than Harmonic mean. Which one of them is more suitable for this data? 4

3. **A fridge manufacturing company observe temperatures of newly developed 8 deep fridges. The observed temperatures (in degree celsius are:**

-10, -8, -2, -4, -4, -1, -12, -3, -13

   (a) What is a Decile? 1

   (b) How many Deciles does a data set have? Why? 2

   (c) Compute the 8th Decile from the data and explain. 3

   (d) What is the value below which 75% observations lie? Find in two distinct ways. 4

4. **A company recorded the monthly sales (in lakhs of) of two salespersons X and Y for the first half of the year:**

Month	Jan	Feb	Mar	Apr	May	Jun
Salesperson X	42	38	45	40	43	41
Salesperson Y	50	28	60	35	55	30

   (a) Does Range consider all values? 1

   (b) Is $\sum |x_i - \bar{x}|$ always greater than $\sum(x_i - \bar{x})$? Prove mathematically. 2

   (c) Calculate the **mean deviation about median** for salesperson X. 3

   (d) Which salesperson has **more consistent sales**? Justify using an appropriate relative measure of dispersion. 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. **The first four moments around 2 of a dataset were the following:**

-1, 5, 20, 90

(a) What is raw moment? 1

(b) What is the standard deviation of the data in the stem? 2

(c) Determine the third central moment. 3

(d) Comment on the kurtosis of the given data. 4

7. **The table below displays the weekly hours of practice and corresponding tournament scores of 9 competitive tennis players. It is theorized that tournament score depends on practice hours.**

Practice Hours (X)	5	7	9	10	12	14	16	18	20
Tournament Score (Y)	45	52	60	68	75	82	88	93	98

(a) What is the range of correlation coefficient (r)? 1

(b) $Y = a + bX$; What does each notation mean in regression context? 2

(c) Estimate and interpret the regression coefficient of y on x. 3

(d) Estimate the regression coefficient of x on y. Is this model realistic? Explain. 4

8. **The monthly website traffic (in thousands of visits) for an online platform over the past 7 months is provided below:**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul
Visits	42	48	55	52	60	65	70

(a) What is the mulplicative model? 1

(b) Mention the methods of measuring the trend. 2

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

(d) Plot the trend and forecast traffic for August using two methods and compare. 4

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