Canopus

MYMENSINGH GIRLS' CADET COLLEGE
THIRD TERM-END EXAMINATION - 2025
CLASS: XI
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. **The weekly sales (in hundreds of dollars) for a retail store over six weeks are recorded as 12, 15, 18, 20, 22, and 25 (denoted by y). The store manager claimed that the square of total sales exceeds the total of squared sales.**

   (a) Is the type of blood group (A, B, AB, O) a qualitative or quantitative variable? 1

   (b) Differentiate between ratio and interval scale. 2

   (c) Calculate $\sum_{i=1}^{6}(y_i - 3y_i)^2$ using the provided data. 3

   (d) Determine whether the manager's claim is correct based on the data. 4

2. **Income and expenditure (both in thousands) of some individuals in four successive months are collected:**

Income (x)	20	30	25	10
Expenditure (y)	15	27	18	5

   (a) What is a discrete variable? 1

   (b) Can fractional numbers be discrete? Explain briefly. 2

   (c) Find $\sum_{i=1}^{4}(x_i)(y_i - 3)$.

   (d) Are, in the stem, $\sum_{i=1}^{n}\sum_{i=1}^{n} x_i y_j = \sum_{i=1}^{n} x_i y_i$? Vindicate. 4 4

3. **The ages of 20 participants in a fitness program were recorded and found to be as follows:**

25, 30, 28, 35, 40, 38, 26, 32, 36, 31
27, 33, 29, 41, 42, 37, 34, 39, 43, 45

   (a) What does the width of the bins represent in a histogram? 1

   (b) Relate histogram and stem and leaf plot 2

   (c) Create a frequency distribution and interpret. 3

   (d) Create a Histogram from the data and explain. If the no. of classes were fewer, how would the pattern of the distribution shift? 4

Group - B

4. **A passer-by walks 3 hours at 5 km per hour (kph), another 3 hours at 4 kph, and another 3 hours at 3 kph.**

   (a) When is harmonic mean suitable? 1

   (b) Which mean could we use for the given data and why? 2

   (c) Find the average speed of the passer-by usingt he proper method. 3

   (d) Find the correct and suitable average speed using another method and mathematically show they are equivalent. 4

5. **The following table presents the distribution of monthly salaries (in thousand BDT) of employees in two different departments of a company.**

Salary Range (in 1000 BDT)	Number of Employees Department - X	Number of Employees Department - Y
20-25	8	6
25-30	14	12
30-35	19	21
35-40	24	26
40-45	15	10

(a) what is the relationship among AM, GM, and HM? 1

(b) If $\bar{X} = 3,$ and $n = 10$, what is $\sum X_i$? 2

(c) Determine the arithmetic mean salary of employees in Department - X. 3

(d) Compute the combined mean salary. Is it higher than the arithmetic mean of Department - Y? Justify your answer with a statistical explanation. 4

6. **Temperatures of two cold regions for five days are as below:**

City A: 2, 1, -1, 0, 3

City B: 3, 0, -2, 2, 3

(a) What is dispersion? 1

(b) Illustrate the necessity of dispersion with an example. 2

(c) Find the variance of temperature of city A. 3

(d) Which city has more consistent temperature? Analyze. 4

–AAM–

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Group - A

1. **Below are some information, with two variables x and y:**

x_i	3	4	1	0
y_i	1	5	0	2

(a) What is a qualitative variable? 1

(b) Find $\sum_{i=1}^{4} x_i^2$ 2

(c) Prove that $\sum_{i=1}^{4}(x_i + y_i) = \sum_{i=1}^{4} x_i + \sum_{i=1}^{4} y_i$ 3

(d) Find the value of $\sum_{i=1}^{4} x_i y_i - \sum_{i=1}^{4} x_i + 4$ 4

2. **A health researcher recorded the daily steps (in thousands) of five individuals over a week:**

$$y_1 = 8,\ y_2 = 5,\ y_3 = 12,\ y_4 = 10,\ y_5 = 7$$

(a) What is ordinal data? 1

(b) Explain change of origin and scale with an example. 2

(c) Compute $\sum_{i=1}^{5}(y_i - 10)^2$. 3

(d) Evaluate $\sum_{i=1}^{5}(2y_i^2 - 3y_i + 4)$ and comment on how shifting the origin would affect this sum. 4

3. **The following table tracks the number of individuals who sleep within specific hourly intervals.**

Hours of Sleep (per night)	4-5	5-6	6-7	7-8	8-9	9-10	10+
Number of Individuals	12	20	25	30	18	8	7

(a) What is the purpose of a frequency distribution? 1

(b) Relate histogram and stem and leaf plot 2

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

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

Group - B

4. **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 61^{st} percentile from the data and explain. 3

(d) Do quantiles depend on change of origin and scale. Prove using two examples. 4

5. **A student walks 3 hours at 5 km per hour (kph), 4 hours at 4 kph, and 2 hours at 3 kph.**

   (a) When is harmonic mean suitable? 1

   (b) Which mean could we use for the given data and why? 2

   (c) Find the average speed using weighted harmonic mean. 3

   (d) Find the correct and suitable average speed using another method and mathematically show they are equivalent. 4

6. **Rainfall measurements (in mm) of two cities for six days are as below:**

Day	1	2	3	4	5	6
City X	15	12	10	18	14	11
City Y	20	8	25	5	22	10

   (a) What is a measure of dispersion? 1

   (b) Explain with an example why measuring dispersion is important in data analysis. 2

   (c) Calculate the variance of rainfall for City X. 3

   (d) Which city shows more consistent rainfall? Justify. 4

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