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SUBJECT CODE NO: - Y-2114
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y (Sem-V)
Examination March / April - 2023
Mathematics MAT-503 Mathematical Statistics - I

[Time: 1:30 Hours]

[Max. Marks: 50]

Please check whether you have got the right question paper.

N. B

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1 A) Attempt any one:

- a) State and prove the formula for combined mean of series. 08
- b) Explain "Ogive" with suitable example. 08

B) Attempt any one:

- c) Find the geometric mean of the following frequency distribution: 07

Marks	0-10	10-20	20-30	30-40
No. of Students	5	8	3	4

- d) Find the harmonic mean of the following frequency distribution: 07

Class Interval	2-4	4-6	6-8	8-10
Frequency	20	40	30	10

Q2 A) Attempt any one:

- a) Establish the relationship between mean square deviation and variance. 08
- b) Explain the various measures of dispersion with their merits and demerits. 08

B) Attempt any one.

- c) For 100 observations, the mean and variance were obtained as 19 and 9 respectively. Latter on it was discovers that the observation 12 was misread as 21. Calculate the correct mean and variance of the actual data. 07
- d) The first three moments of a distribution about the value 5 of the variables are 2, 07 20 and 40. Find the mean , variance and third moment about mean.

Q3 A) Attempt any one:

a) Define:

- i. Median
- ii. Mode
- iii. Moments
- iv. Probability
- v. discrete random variable

05

b) prove that the algebraic sum of the deviations of all the variate values from their arithmetic mean is zero. 05

B) Attempt any one:

c) a problem in mathematics is given to three students A,B,C whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. 05

What is the probability that the problem will be solved?

d) If a random variable X has the probability density function as follows: 05

$$f(x) = \begin{cases} \frac{1}{4}, & -2 < x < 2, \\ 0, & \text{otherwise} \end{cases}$$

Find : i) $P(x < 1)$

ii) $P[(2x + 3) > 5]$

Q4 Choose the correct alternative of the following:

10

1) The skewness when mean = 4, median = 4, and standard deviation = 3 is

- _____
- a) 1 b) -1 c) 0 d) 2

2) If $P(A) = 0.37$, $P(B) = 0.48$ and $P(A \cup B) = 0.85$ then the value of $P(A \cap B)$ is _____

- a) 3.7 b) 4.8 c) 8.5 d) 0

3) The value of the variable correspond to maximum frequency is known as _____

- a) Median b) Mode c) Mean d) Harmonic mean

4) The geometric mean of 6, 24 is _____

- a) 12 b) 13 c) 14 d) 11

5) The sum of the squares of the deviations of all the values taken about their arithmetic mean is _____

- a) Zero b) Maximum c) Minimum d) Infinite