18226

# BRAINWARE UNIVERSITY



**Term End Examination 2025-2026**
**Programme – MBA(HM)-2025**
**Course Name – Applied Statistics in Healthcare**
**Course Code - MHM10500**
**( Semester I )**

**Full Marks : 60** **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

## Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select the correct classification of quantitative data as

a) Nominal and ordinal data
b) Primary and secondary data
c) Discrete and continuous data
d) Time series and cross section data

(ii) For a moderately skewed distribution, select the correct option.

a) Mode = Median – A.M.
b) 2Mode = 2Median – A.M.
c) Mode = 2Median – 2A.M.
d) Mode = 3Median-2A.M.

(iii) In a frequency distribution with class intervals 11-20, 21-30, 31-40, 41-50 with corresponding frequencies 3,4,6,3, the frequency density corresponding to 21-30 is computed as

a) 2/9
b) 3/9
c) 4/9
d) 4/16

(iv) Select the correct option. The Coefficient of Correlation between X and -X is

a) 0
b) +1
c) -1
d) 0.5

(v) A process by which we estimate the value of dependent variable on the basis of one or more independent variables is called

a) Correlation
b) Regression
c) Standard deviation
d) None of these

(vi) Choose the correct option. Probability lies between

a) -1 and +1
b) 0 and 1
c) 0 and n
d) None of these

(vii) Choose the correct option. The probability of all possible outcomes of a random experiment is computed as

a) 1
b) 0
c) infinity
d) none of these

(viii) The random variables X and Y follow Bin $(3, \frac{1}{8})$ and Poisson (7) and they are independently distributed. Then $\mathrm{Var}\left(X - \frac{Y}{6}\right)$ is estimated as

a) 302/576
b) 280/576
c) 301/576
d) 250/576

(ix) Select the time series data from the following.

a) Monthly sales data of a company
b) The heights of a group of students
c) The price of a single stock on a specific day
d) An experiment's results over multiple trials

(x) The "trend" component in a time series indicates to

a) Short-term fluctuations
b) Long-term upward or downward movements
c) Periodic fluctuations
d) Random noise in the data

(xi) Choose the correct option. The moving average method is primarily used to

a) Measure the seasonal variation in time series
b) Identify random fluctuations in the data
c) Smooth out short-term fluctuations to highlight the long-term trend
d) Estimate future trends based on past data

(xii) A 3-period moving average is calculated by

a) Taking the sum of the first three observations only
b) Adding the values of three consecutive periods and dividing by 3
c) Averaging the last three periods only
d) None of the these

(xiii) Identify the one of the following that is a commonly used index number in economics.

a) Consumer Price Index (CPI)
b) Compound Annual Growth Rate (CAGR)
c) Gross Domestic Product (GDP)
d) Break-Even Analysis

(xiv) Identify the one of the following is true about the Laspeyres Index.

a) It uses current year quantities.
b) It uses base year quantities.
c) It uses an average of base and current year quantities.
d) It gives more weight to items with higher prices.

(xv) The regression coefficient of Y on X of the regression line Y=3X-4 is estimated as

a) 1/3
b) 2/3
c) 3
d) 1

## Group-B

(Short Answer Type Questions) 3 x 5=15

2. Discuss two principle methods of data collection. (3)

3. Justify the importance of Pearson's product moment correlation coefficient to assess linear relationship between two variables in brief. (3)

4. The number of letters in each of 40 words were counted and the following frequency distribution was formed. Calculate the arithmetic mean of word length. (3)

| Word length (X) | Number of words (f) |
|---|---|
| 2 | 6 |
| 3 | 8 |
| 4 | 12 |
| 5 | 10 |
| 7 | 4 |
| Total | 40 |

5. If $P(A) = 2P(B) = 4/13$ and $P(A \cap B) = 6/13$, then calculate the value of $P(A \cup B)$. (3)

6. Evaluate the 4-period weighted SMA for the series: 10, 13, 16, 19, 22, 25 with weights 3, 5, 7, 4, 5, 3. (3)

OR

Calculate the 3-period weighted CMA for the series: 10, 13, 16, 19, 22 with weights 3, 5, 7, 4, 5. (3)



## Group-C

(Long Answer Type Questions) 5 x 6=30

7. Discuss graphical presentation of data. (5)

8. Explain correlation between two variables $X$ and $Y$. Also explain Pearson's correlation coefficient $r$ and cite its properties. (5)

9. Evaluate Pearson's $r$ of the following bivariate data: (5)

| X | 0 | 1 | 0.4 | -2 | -1.6 | 3 |
|---|---|---|---|---|---|---|
| Y | -12 | -8 | -5 | 4 | 8 | 7 |

Mention the nature of correlation between $X$ and $Y$ from the value of $r$.

10. State the Bayes' Theorem. Explain Bayes' Theorem for three arbitrary events A, B and C. (5)

11. Discuss on uniform distribution. Evaluate its expectation, variance, two measures of skewness and kurtosis. (5)

12. Estimate exponential trend equation based on following observations on (X, Y): (5)

| $t$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| $y_t$ | 320.17 | 275.62 | 318.85 | 286.16 | 284.43 | 292.65 | 300.25 |

OR

Estimate a linear trend line to the following data by the method of least squares (5)

| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|
| Sales (in lakh) | 76 | 84 | 81 | 79 | 77 | 78 | 112 | 88 | 96 |