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Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – MBA(HM)-2024

Course Name – Statistics for Decision Making

Course Code - MHM10106

(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) Median of a dataset 5,4,7,8 is calculated as
- a) 7
 - b) 6
 - c) 8
 - d) 4
- (iii) For a positively skewed distribution, select the correct option.
- a) A.M. = Median \leq Mode
 - b) A.M. \geq Median = Mode
 - c) A.M. = Median = Mode
 - d) A.M. \geq Median \geq Mode
- (iv) If $b_{xy} < 0$ and $b_{yx} < 0$, then r is evaluated as
- a) > 0
 - b) $= 0$
 - c) < 0
 - d) none of these
- (v) Select the correct option. If $\text{cov}(X, Y) = 0.6$, $b_{yx} = 1.2$, then $\text{var}(X)$ is evaluated as
- a) 0.5
 - b) 0.2
 - c) 0.72
 - d) 0.40
- (vi) For a simple linear regression model $2X = 4Y - 1$ of X on Y and the correlation coefficient between X and Y being 0.48, select the correct regression line of Y on X.
- a) $Y = 0.1152X - 5$
 - b) $Y = -0.11X + 3$
 - c) $Y = 0.11X - 7$
 - d) $Y = -0.1152X - 7$
- (vii) A random variable is defined as
- a) A variable that only takes on integer values.
 - b) A variable whose values are determined by chance.

- c) A variable that is always constant. d) A variable that can only take on a finite number of values.
- (viii) For a random variable X following a normal distribution with mean 5 and s.d. 4, the probability $P(Y > 0)$ where $Y = \frac{X-5}{4}$ is computed as
- a) 0.45 b) 0.25
c) 0.15 d) 0.5
- (ix) For $X \sim \text{Poisson}(5)$, the value of $P(X=0)$ is estimated as
- a) e^{-5} b) $\frac{1}{2}e^{-5}$
c) $2e^{-5}$ d) $4e^{-5}$
- (x) Identify the correct option: The index number that can be used for multi-purpose is
- a) General Index Number b) Special Index Number
c) Cost of Living Index Number d) None of these
- (xi) 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
- (xii) In time series, the seasonal component indicates to
- a) Long-term upward or downward movement in the data b) Repetitive patterns at regular time intervals
c) Random or irregular fluctuations d) Changes in the data due to economic cycles
- (xiii) Choose one of the following moving averages that gives more weight to recent observations.
- a) Simple Moving Average (SMA) b) Weighted Moving Average (WMA)
c) Cumulative Moving Average (CMA) d) Centered Moving Average
- (xiv) 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
- (xv) 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

Group-B
(Short Answer Type Questions)

3 x 5 = 15

2. 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 |

3. Discuss on questionnaire and schedule in collection of primary data. Discuss on the requirements for drafting a questionnaire. (3)
4. Write a short note on conditional probability. State the condition of independence of two events A and B using the definition of $P(A|B)$. (3)
5. Evaluate the 4-period SMA for the series: 10, 13, 16, 19, 22, 25. (3)
6. Justify the importance of Pearson's product moment correlation coefficient to assess linear relationship between two variables in brief. (3)

OR

Explain two regression coefficients related to simple linear regression. Given that $\bar{Y} = 18$, $r = 0.45$, $s.d.(X) = 0.6$, $s.d.(Y) = 0.4$, $\bar{X} = 15$, estimate the value of Y at $X=10$. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Define central tendency. Discuss on arithmetic mean, median and mode. (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. Define conditional probability. For three events A, B and C, given that $P(A) = 0.2$, $P(B) = 0.3$, $P(C) = 0.5$, $P(A \cap B) = 0.18$, $P(B \cap C) = 0.12$, $P(A \cap C) = 0.24$ and $P(A \cap B \cap C) = 0.11$, calculate (i) $P(A|B)$, (ii) $P(B|C)$ and (iii) $P(A|C)$ and $P(B|A \cap C)$. (5)
11. Discuss on uniform distribution. Evaluate its expectation, variance, two measures of skewness and kurtosis. (5)

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12. Given the following data for three products, calculate the weighted index number for Year 2 using Year 1 as the base year, with weights assigned as follows: (5)

- Product A: Weight = 2
- Product B: Weight = 3
- Product C: Weight = 1

| Product | Year 1 Price | Year 2 Price |
|---------|--------------|--------------|
| A | \$10 | \$12 |
| B | \$20 | \$18 |
| C | \$30 | \$36 |

OR

Calculate the chain price index for Year 2 and Year 3, given the following prices: (5)

- Year 1 Price: \$80
- Year 2 Price: \$100
- Year 3 Price: \$120

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