

CUET (UG) – MATHEMATICS

Chapter Test - Section B2: Applied Mathematics - Unit V: Index Numbers and Time Based Data

General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

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1. A time series is a set of data points collected, observed, or recorded at:
 - (A) Random intervals of time
 - (B) Successive equal intervals of time
 - (C) Any point in space
 - (D) Different geographical locations
2. The decrease in the price of woolen clothes during summer is an example of:
 - (A) Secular trend
 - (B) Cyclical variation
 - (C) Seasonal variation
 - (D) Irregular variation
3. In the additive model of time series, the observed value Y is expressed as:
 - (A) $Y = T \times S \times C \times I$
 - (B) $Y = T + S + C + I$
 - (C) $Y = T + S - C + I$
 - (D) $Y = T \times S + C + I$
4. The long-term persistent rise or fall in a series is known as:
 - (A) Seasonal variation
 - (B) Secular trend
 - (C) Cyclical variation
 - (D) Random movement
5. Variation caused by floods, earthquakes, or strikes is classified as:
 - (A) Secular trend
 - (B) Seasonal variation
 - (C) Cyclical variation
 - (D) Irregular variation
6. For a time series data, if the trend line is $y = 20 + 3x$ (with origin at 2020), the estimated value for the year 2025 is:
 - (A) 35
 - (B) 23
 - (C) 32
 - (D) 40
7. The method of moving averages is used to:
 - (A) Measure seasonal variations only
 - (B) Smooth out the fluctuations to find the trend
 - (C) Determine the exact value of irregular variations
 - (D) Forecast cyclical movements only
8. A business cycle consisting of prosperity, recession, depression, and recovery is a:
 - (A) Seasonal variation
 - (B) Cyclical variation
 - (C) Secular trend
 - (D) Irregular variation
9. If the 3-yearly moving averages for the sequence 10, 12, 14, 16, 18 are calculated, the first moving average value is:
 - (A) 10
 - (B) 12
 - (C) 14
 - (D) 13

10. In the method of least squares for a linear trend $y = a + bx$, the value of b is calculated using the formula (where $\sum x = 0$):
- (A) $\sum xy / \sum x^2$
 - (B) $\sum y / n$
 - (C) $\sum x^2 / \sum xy$
 - (D) $\sum x / \sum y$
11. The period of seasonal variation is usually:
- (A) Less than one year
 - (B) More than ten years
 - (C) Exactly five years
 - (D) Between three to five years
12. The multiplicative model $Y = T \cdot S \cdot C \cdot I$ is preferred over the additive model when:
- (A) Components are independent
 - (B) Components are proportional to the trend
 - (C) Trend is constant
 - (D) Data is purely random
13. Using the semi-average method, if the data is divided into two parts and the averages are 45 and 55 respectively, the trend is:
- (A) Decreasing
 - (B) Constant
 - (C) Increasing
 - (D) Unpredictable
14. If the equation of a trend line is $y = 100 + 5x$ and the origin is 2018, what was the trend value in 2016?
- (A) 110
 - (B) 90
 - (C) 100
 - (D) 95
15. Which component of the time series is most difficult to predict?
- (A) Secular trend
 - (B) Seasonal variation
 - (C) Cyclical variation
 - (D) Irregular variation
16. In a 4-yearly moving average, centering is required because:
- (A) The average falls between two time periods
 - (B) The trend is non-linear
 - (C) The data is inconsistent
 - (D) The number of years is odd
17. The method of least squares ensures that the sum of squares of the:
- (A) Observations is maximum
 - (B) Residuals is minimum
 - (C) Residuals is maximum
 - (D) Trend values is zero
18. A trend that is represented by a straight line is called:
- (A) Parabolic trend
 - (B) Linear trend

- (C) Exponential trend
(D) Logarithmic trend
19. If $\sum y = 500$, $n = 5$ and $\sum x = 0$, then the value of the intercept a in $y = a + bx$ is:
(A) 5
(B) 100
(C) 2500
(D) 50
20. Which method of trend analysis is considered the most objective and accurate?
(A) Freehand curve method
(B) Semi-average method
(C) Moving average method
(D) Least squares method

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