CUET Applied Mathematics Test - Set 31

Unit V: Time Based Data (Intermediate to Advanced)

SOLUTIONS

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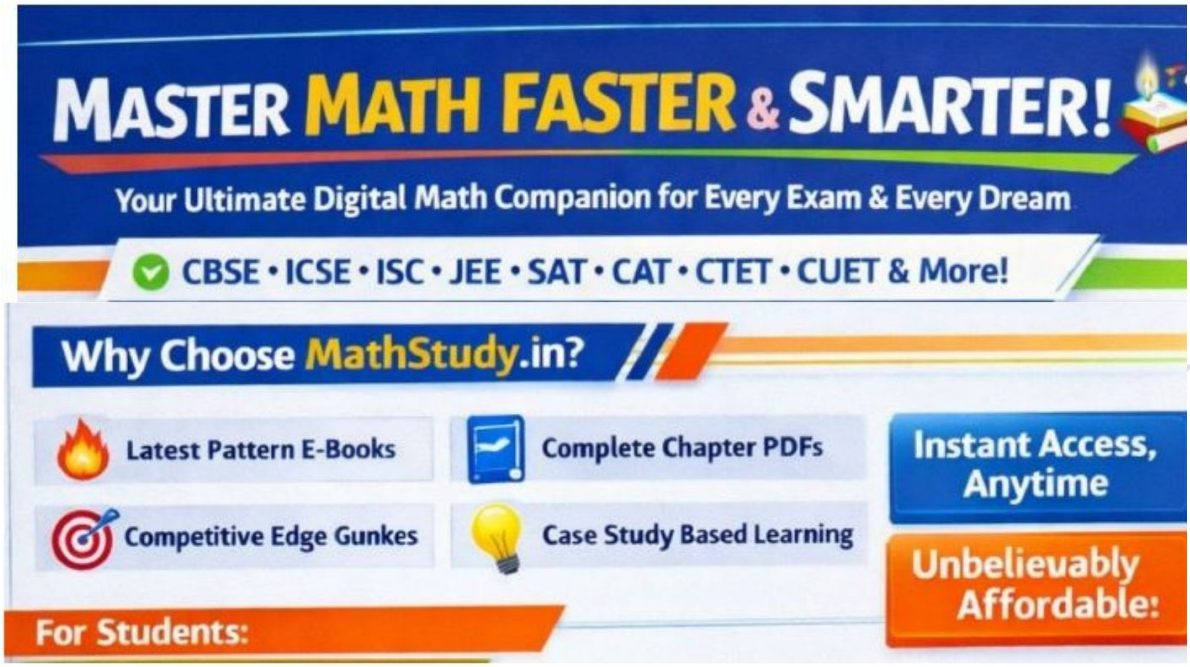

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Solutions

1. **Solution:** For weighted moving averages, the denominator must be the sum of the weights. $1 + 2 + 1 = 4$. Thus, the smoothed value is $(Y_{t-1} + 2Y_t + Y_{t+1})/4$. **Correct Option: (B)**

2. **Solution:** Origin 2018 $\rightarrow$ 2021 means we replace X with $(X + 3)$ if we move backward, or look at the value at 2021. At 2021, $X = 3$. New $a = 50 + 2(3) = 56$. The slope b remains 2. New equation: $Y = 56 + 2X$. **Correct Option: (A)**

3. **Solution:** Any variation that repeats within a fixed period of one year or less (like weekly, monthly, or quarterly) is a Seasonal Variation. **Correct Option: (C)**

4. **Solution:** The semi-average method connects two mean points with a straight line, thus assuming the trend is linear. **Correct Option: (C)**

5. **Solution:** In multiplicative models, the trend is in units, but S, C, and I are ratios (often multiplied by 100 to show as percentages). **Correct Option: (B)**

6. **Solution:** For $n = 9$, X values are $-4, -3, -2, -1, 0, 1, 2, 3, 4$. If 2015 is 0, then 2014 is -1, 2013 is -2, and 2012 is -3. **Correct Option: (B)**

7. **Solution:** Moving averages "eat" data at the ends. For an m-period moving average, we lose $(m - 1)/2$ data points at each end. **Correct Option: (C)**

8. **Solution:** A seasonal index of 85 means 85% of the average. This is $100 - 85 = 15\%$ below the average. **Correct Option: (B)**

9. **Solution:** For an even number of years, the average falls between two time points (e.g., between Year 2 and Year 3). Centering shifts it to align with a specific year. **Correct Option: (A)**

10. **Solution:** The presence of an X^2 term indicates a second-degree polynomial, known as a parabolic trend. **Correct Option: (C)**

11. **Solution:** To remove seasonality, we divide the original data by the seasonal index. Y/S. **Correct Option: (B)**

12. **Solution:** Strikes, floods, and wars are unpredictable, non-repeating events, categorized as Irregular variations. **Correct Option: (C)**

13. **Solution:** The annual increase is the slope b. $b = \sum XY / \sum X^2 = 40/10 = 4$. **Correct Option: (B)**

14. **Solution:** For monthly data, the average index is 100. Total for 12 months $= 12 \times 100 = 1200$. **Correct Option: (B)**

15. **Solution:** The graphical method depends on the person drawing the line (subjective), while semi-averages use a fixed mathematical calculation. **Correct Option: (B)**