CUET Mathematics Test

Chapter: Unit V: Index Numbers and Time Based Data

SOLUTIONS

www.udgamwelfarefoundation.com

**For Best Mathematics E-Books, Visit:
www.mathstudy.in**

Special Features
◆ **Board-Specific** – CBSE, ICSE, ISC, State Boards
◆ **Exam-Focused** – JEE, SAT, CAT, CTET, CUET, NTSE
◆ **Grade-Wise** – Class 6 to 12
◆ **Bilingual Options** – English & Hindi Medium Support
◆ **Printable & Shareable** – Use offline, anytime

How to Order:
Visit : https://www.mathstudy.in
Browse by Exam, Class, or Topic
Add to Cart & Checkout

Contact & Support:
✉ Email: admin@mathstudy.in
💬 WhatsApp Support Available : +91-+91 92118 65759

💡 Why Wait? Empower your learning journey, save time, and achieve your dreams!

🌐 Explore & Start Learning Today:
https://www.mathstudy.in – Premium eBooks for success
https://www.udgamwelfarefoundation.com – Free PDFs, practice tests, & guida

MathStudy.in — Empowering Learners, Enabling Educators, Encouraging Excellence.
Digital Learning | Affordable Excellence | Trusted by Thousands

Solutions

1. **Solution:** The additive model assumes that the components are independent of each other and are added together: $Y = T + S + C + I$. **Correct Option: (B)**

2. **Solution:** The secular trend represents the long-term direction (increase or decrease) of the data over a long period. **Correct Option: (C)**

3. **Solution:** Variations that repeat themselves over a period of more than one year (usually 3-10 years) are cyclical variations. **Correct Option: (C)**

4. **Solution:** Moving averages are used to smooth out short-term fluctuations (seasonal and irregular) to highlight the underlying secular trend. **Correct Option: (C)**

5. **Solution:** 3-year moving average for 3rd year $= (Y_2 + Y_3 + Y_4)/3 = (12 + 15 + 18)/3 = 45/3 = 15$. **Correct Option: (B)**

6. **Solution:** Seasonal variations are periodic fluctuations that repeat within a year, such as demand for woolens in winter. **Correct Option: (C)**

7. **Solution:** When $\sum X = 0$, the normal equation $\sum Y = na + b \sum X$ simplifies to $\sum Y = na$, thus $a = \sum Y/n$. **Correct Option: (A)**

8. **Solution:** These are the two standard normal equations derived from minimizing the sum of squared residuals for a linear trend. **Correct Option: (A)**

9. **Solution:** For an even period like 4, the moving average initially falls between years. Centering it places the first value at the center of the period, which is the end of the 2nd year (or start of 3rd). **Correct Option: (C)**

10. **Solution:** Irregular variations occur due to unforeseen, random events like strikes, floods, or wars. **Correct Option: (C)**

11. **Solution:** In the multiplicative model, indices are ratios. 1.20 means 120% of the trend, or 20% above the trend. **Correct Option: (C)**

12. **Solution:** $X = 2024 - 2020 = 4$. $Y = 20 + 1.5(4) = 20 + 6 = 26$. **Correct Option: (B)**

13. **Solution:** Secular trend, seasonal, and cyclical variations have patterns; irregular variations are completely random and unpredictable. **Correct Option: (D)**

14. **Solution:** To make the groups equal in the semi-average method for an odd number of years, the middle year is typically omitted. **Correct Option: (A)**

15. **Solution:** In $Y = a + bX$, 'b' is the gradient or slope, representing the change in Y for every 1-unit increase in X (time). **Correct Option: (B)**

16. **Solution:** $a = \sum Y/n = 150/5 = 30$. $b = \sum XY/\sum X^2 = 30/10 = 3$. Equation: $Y = 30 + 3X$. **Correct Option: (A)**

17. **Solution:** Cyclical patterns span several years, so they are best observed and measured using annual data over several decades. **Correct Option: (C)**

18. **Solution:** $X = 2015 - 2018 = -3$. $Y = 100 + 5(-3) = 100 - 15 = 85$. **Correct Option: (C)**

19. **Solution:** Fisher's Ideal Index is a method for calculating Price/Quantity Index numbers, not for measuring time series trends. **Correct Option: (D)**

---

20. **Solution:** Deseasonalization is the statistical process of dividing the original data by the seasonal index to see the data without seasonal influence. **Correct Option: (C)**