

STATISTICS

Course Code: STD 5.21

(Time Series Analysis)

Total Mark: 70

Pass Mark: 28

Time: 3 hours

Answer five questions, taking one from each unit.

UNIT-I

1. (a) Write the correct answers: 1×2=2
 - (i) Heavy sales at the supermarket on the occasion of a festival is an example of
(A) trend (B) seasonal component
(C) cyclical component (D) random component
 - (ii) A continuously increasing demand for two wheelers in the last 15 years is an example of
(A) irregular component (B) secular trend
(C) seasonal component (D) cyclical component
- (b) Define time series analysis. Explain some of the uses of time series. 2+4=6
- (c) Explain the method of moving average for measuring trend. 6
2. (a) Write the correct answers: 1×2=2
 - (i) The mathematical model(s) used in time series
(A) is fixed effect model
(B) is random effect model
(C) is additive model
(D) are additive and multiplicative model
 - (ii) A long term variation in a time series is attributed to

3. (a) Write the correct answers: $1 \times 2 = 2$
- (i) Seasonal variations have got a maximum period of
 - (A) three months
 - (B) four months
 - (C) six months
 - (D) one year
 - (ii) Heavy sales of woollen cloths during the winter season is an example of
 - (A) secular trend
 - (B) seasonal variation
 - (C) irregular variation
 - (D) cyclical variation
- (b) Describe the ratio to moving average method of measuring seasonal indices. 6
- (c) Discuss the procedure for fitting the logistic curve. 6
4. (a) Write whether the following statements are *True* or *False*: $1 \times 2 = 2$
- (i) Trend values can be calculated for all the years by moving average method.
 - (ii) Ratio to moving average method can be used to estimate the trend.
- (b) Explain the moving average method of measuring trend. 6
- (c) Calculate the 4 yearly and 7 yearly moving averages from the values given below: 6
- 82, 73, 74, 75, 73, 72, 76, 76, 74, 75, 75, 73, 75, 76, 75

UNIT-III

5. (a) Write the correct answers: $1 \times 2 = 2$
- (i) Cyclical variations are generally associated with the:
 - (A) economic cycle
 - (B) population cycle
 - (C) trade cycle
 - (D) social cycle
 - (ii) Cyclical variations in a time series are caused by
 - (A) lockouts and strikes

- (c) Explain the term cyclical components of a time series. 2
6. (a) Write whether the following statements are *True* or *False*: $1 \times 2 = 2$
 (i) Cyclical components have a period more than a year.
 (ii) The term 'prosperity' is related with cyclical fluctuations.
 (b) Explain about cyclical components of time series. 6
 (c) Describe the two methods for measuring cyclical components. 6

UNIT-IV

7. (a) Define autocorrelation function (ACF). 2
 (b) Discuss various sources of autocorrelation in the data. 7
 (c) Discuss the first order autoregression series. 5
8. (a) Give the concept of stationarity in time series. What do you mean by strictly stationary in time series? $2+3=5$
 (b) Write a note on weak stationarity in time series. 5
 (c) Describe about correlogram of moving average. 4

UNIT-V

9. (a) Define irregular or random component with some examples. 3
 (b) Describe the variate difference method. 7
 (c) Write a note on the significance of $(V_k - V_{k+1})$. 4
10. (a) Write a note on Brown's discounted regression method. 5
 (b) Discuss the Box-Jenkins method of forecasting. 5
 (c) Discuss briefly about exponential smoothing method. 4
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