

FYUG Even Semester Exam., 2025

STATISTICS

(2nd Semester)

Course No. : STAIDC-151

(Index Number and Time Series Analysis)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

UNIT—I

1. Answer any *four* of the following questions :

1×4=4

- (a) Define index number.
- (b) State some limitations of index number.
- (c) State some applications of index number.
- (d) Write Paasche's index number formula.
- (e) What is base year in an index number?

2. Answer any one of the following questions : (3)

(a) "Index numbers are barometers." Explain.

(b) Why is choice of base year important in index number construction?

3. Answer any one of the following questions :

(a) (i) Write a note on selection of base period for construction of base index number.

(ii) Describe the different problems faced in construction of index number.

(b) Construct price index number from the following data using (i) Laspeyres', (ii) Paasche's, (iii) Marshal-Edgeworth and (iv) Fisher's method :

Commodity	1990		1995	
	Price	Quantity	Price	Quantity
A	4	20	6	10
B	3	15	5	23
C	2	25	3	15
D	5	10	4	40

UNIT-II

4. Answer any four of the following as directed : 1×4=4

(a) Define time reversal test.

(b) Define factor reversal test.

(c) Define index number is known as ideal index number.

(d) Fisher's index number is _____ of Laspeyres' and Paasche's index number. (Fill in the blank)

(e) What is the main purpose of factor reversal test? (Fill in the blank)

5. Answer any one of the following questions : 2

(a) Write a note on chain-based index number.

(b) What are the advantages of using chain-based index number over fixed-based index number?

6. Answer any one of the following questions : 8

(a) Define consumer price index number. Write the steps of construction of consumer price index number. State some of its uses. 2+4+2=8

(4)

- (b) Using Fisher's index number formula calculate price index number for the following data :

Commodity	1960		1975	
	Price	Quantity	Price	Quantity
A	4	50	10	40
B	3	10	9	12
C	2	5	4	3
D	5	20	6	8

Check if it satisfies time reversal and factor reversal tests.

UNIT—III

7. Answer any four of the following questions :

- Define time series.
- What is the difference between time series and cross-sectional data?
- Give an example of time series data.
- Define trend in time series.
- State few applications of time series.

8. Answer any one of the following questions :

- State some differences between cyclical movement and seasonal variation in a time series.

(5)

- (b) Which component of time series is applicable in the following cases?

- Fire in a factory.
- Sale of umbrella during summer.
- Fall in death rate due to scientific research.
- Flood due to heavy rain.

(iv) Flood due to heavy rain. 8

9. Answer any one of the following questions :

- What are the different components of time series? Discuss briefly each of them with examples. $2+4+2=8$
- What is time series decomposition? Name the methods of time series decomposition. What is the purpose of time series decomposition? $2+4+2=8$

UNIT—IV

10. Answer any four of the following questions : $1 \times 4 = 4$

- What is the importance of trend estimation in time series analysis?
- Name one method of trend in time series
- Give an example of trend in time series analysis.

- (d) What are the limitations of freehand curve method?
 (e) State some advantages of freehand method.

11. Answer any one of the following questions:

- (a) Write a note on semi-average method.
 (b) Write a note on normal equations.

12. Answer any one of the following questions:

- (a) Write a note on method of least square. For the following data, fit a straight-line equation using method of least square:

Year	1960	1961	1962	1963	1964	1965	1966
Production	40	60	50	70	55	75	50

- (b) Write a note on method of moving average. State its merits and demerits.

4+2+2=8

UNIT—V

13. Answer any four of the following as directed :

- (a) Define seasonality in a time series. 1×4=4
 (b) Name one method of estimating seasonal component.

- (c) State one difference between ratio to trend and ratio to moving average method.
 (d) Moving average method eliminates trend. (Fill in the blank)

- (e) Write the equation of second-degree parabola.

14. Answer any one of the following questions : 2

- (a) State some merits and demerits of ratio to trend method.
 (b) Write a note on method of simple average.

15. Answer any one of the following questions : 8

- (a) Write a note on link relative method. State its merits and demerits. 4+2+2=8
 (b) Write a note on ratio to moving average method and state its merits and demerits. 4+2+2=8
