FYUG Even Semester Exam., 2024

STATISTICS

(2nd Semester)

Course No. : STAIDC–151T

(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

SECTION—A

Answer any *twenty* questions :   1×20=20

1. What is an index number?

2. Define price relative.

3. Fill in the blank :

    Index number is a special type of _____.

(*Turn Over*)

4. Write down the formula for Fisher's index number.

5. Mention one limitation of index number.

6. Why is Fisher's formula known as ideal formula?

7. Fill in the blank :

   If the relation $P_{01} \times P_{10} = 1$ holds, it means that price indices satisfy _____.

8. What does consumer price index help to evaluate?

9. On what basis is dearness allowance fixed for a certain cadre of people?

10. Give one example when chain-based method is commonly used.

11. Fill in the blank :

    A time series is a set of values arranged in _____ order.

12. Write True or False :

    A time series consists of four components.

(Continued)

13. Which fluctuation of a time series does secular trend represent?

14. Which component of time series data is associated with monthly fluctuation?

15. Give an example of random component of time series.

16. Write one advantage of freehand method.

17. In how many parts are the original data divided in semi-average method?

18. Write down the equation of the exponential curve.

19. Which method of fitting a trend is most exact?

20. Fill in the blank :

    Moving-average method eliminates _____.

21. Write True or False :

    Simple-average method is used to calculate seasonal indices.

(Turn Over)

22. When does ratio to trend method yield good results?

23. Which method is considered to be the best for ascertaining seasonal indices?

24. Who did expound link relative method of measuring seasonal indices?

25. Fill in the blank :

   Link relatives for calculating seasonal indices are converted into _____.

SECTION—B

Answer any *five* questions :   2×5=10

26. Define base period and current period.

27. What are simple aggregate and weighted aggregate methods of calculations of index number?

28. Show that Marshall-Edgeworth index number passes the time reversal test but not factor reversal test.

29. Describe chain-base method of construction of index number.

30. What are the main problems in analysis of time series data?

31. Which component of time series is mainly applicable in the following cases?

   (a) Fire in a factory

   (b) Fall in death rate due to scientific research

   (c) An upturn in business activity

   (d) A decline in ice cream sales during November to March

32. Explain semi-average method.

33. Write down the normal equations of a second-degree parabola.

34. Write a short note on simple-average method for measuring seasonal variation.

35. Give the merits and demerits of ratio to trend method.

SECTION—C

Answer any *five* questions :   8×5=40

36. Describe different problems faced in constructing index number.

37. Calculate the price index number for the year 2000 with 1995 as base year, using *(i)* Laspeyre's method, *(ii)* Paasche's method, *(iii)* Marshall-Edgeworth method and *(iv)* Fisher's method for the following data :

2+2+2+2=8

Commodity	Price (1995)	Quantity (1995)	Price (2000)	Quantity (2000)
A	4	20	6	10
B	3	15	5	23
C	2	25	3	15
D	5	10	4	40

38. Explain time reversal test and factor reversal test. Show that Fisher's index number formula is ideal formula.   4+4=8

39. Define consumer price index number. Write a note on the construction and uses of consumer price indices.   2+6=8

40. Write down the chief components of time series. Discuss briefly each of them with examples.   2+6=8

41. What is time series? What is the need of editing of data before time series analysis? Describe the mathematical models commonly used for decomposition of a time series. Which of the models is considered to be more useful?   1+2+4+1=8

42. Describe the method of moving average for estimating trend in time series. Discuss its merits and demerits.   4+4=8

43. Fit a straight line trend for the following data :

Year	1997	1998	1999	2000	2001
Sales (₹ '000)	10	13	15	20	22

Also estimate the sales for the year 2005.   6+2=8

44. Explain the ratio to moving-average method for determining seasonal indices in a time series. Mention its merits and demerits.   6+2=8

45. Name the different methods for determining seasonal variation. Explain the link relative method as used in the analysis of time series.   2+6=8

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