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**2021/TDC/CBCS/ODD/  
STSDSE-501T(A/B)/119**

**TDC (CBCS) Odd Semester Exam., 2021  
held in March, 2022**

**STATISTICS**

**( 5th Semester )**

Course No. : STSDSE-501T

Full Marks : 50

Pass Marks : 20

Time : 3 hours

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

Honours Students will answer Option—A and  
Pass Students will answer Option—B

**OPTION—A**

( For Honours Students only )

Course No. : STSDSE-501T (A)

**( Time Series Analysis )**

**SECTION—A**

Answer any *fifteen* of the following questions as  
directed : 1×15=15

1. Write the name of one method used for measuring trend of a time series.



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2. A time series is a set of values arranged in \_\_\_\_\_ order. ( Fill in the blank )
3. Which component of time series data is associated with monthly fluctuations?
4. The multiplicate model of time series is given by \_\_\_\_\_. ( Fill in the blank )
5. The moving average method eliminates \_\_\_\_\_. ( Fill in the blank )
6. Ratio to trends method measures \_\_\_\_\_ variations. ( Fill in the blank )
7. Write one limitation of ratio to trend method.
8. State one merit of simple average method.
9. Deseasonalization of data means eliminating \_\_\_\_\_ from the series. ( Fill in the blank )
10. Link relatives for calculating seasonal indices are converted into \_\_\_\_\_. ( Fill in the blank )

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11. Cyclic movement in a time series occurs due to \_\_\_\_\_. ( Fill in the blank )
12. The harmonic analysis method of determining cycles utilises \_\_\_\_\_ series. ( Fill in the blank )
13. Growth curves cannot be determined by \_\_\_\_\_. ( Fill in the blank )
14. Write the equation of the Gompertz curve.
15. What is white noise process?
16. State the model for autoregressive process of order one.
17. Give an example of random component of time series.
18. What is weak stationarity?
19. What is correlogram?
20. Define autocovariance.

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( Turn Over



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SECTION—B

Answer any five of the following questions :  $2 \times 5 = 10$

21. Enumerate the objective of analysis of time series.
22. Write two demerits of trend fitting by the principle of least squares.
23. Explain the simple average method for measuring seasonal variation.
24. Briefly explain detrending of time series data.
25. Explain deseasonalization of data.
26. Briefly discuss the 'residual approach' of measuring cyclic movement in a time series.
27. Write a note on Moving Average (MA) process.
28. Obtain the Complementary Function (CF) of Autoregressive (AR) process of order two.
29. Write a short note on autocorrelation.
30. Obtain the expression for correlogram of moving average of extent  $m$ .

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SECTION—C

Answer any five of the following questions :  $5 \times 5 = 25$

31. (a) Explain the process of fitting a second-degree trend equation.  $2\frac{1}{2}$   
(b) Write a short note on the method of semiaverages.  $2\frac{1}{2}$
32. (a) Explain the additive model of a time series analysis. 3  
(b) Briefly discuss the elimination of trend by free-hand curve method with its merits. 2
33. Describe the ratio to trend method with its demerits.
34. Explain the method of moving averages for eliminating trend in time series data with its merits and demerits.
35. Discuss link relative method for measuring seasonal fluctuation in time series with its merits.
36. Explain in detail a sophisticated method of determining the cyclical component of a time series.

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37. Explain the method of 'three selected points' for fitting modified exponential curve.

38. For AR(1) process, prove that

$$I_k = a^k$$

where symbols have their usual meanings.

39. Briefly discuss the variate difference method of measuring random component of a time series.

40. Explain briefly the exponential smoothing method.

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OPTION—B

( For Pass Students only )

Course No. : STSDSE-501T (B)

( Vital Statistics )

SECTION—A

Answer any fifteen of the following questions as directed : 1×15=15

1. What is population composition?
2. How is population composition measured?
3. What are the three types of population composition?
4. Define dependency ratio.
5. What events are covered under vital statistics?
6. Define vital statistics.
7. What are the measures of mortality to express death rates?



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8. What is meant by vital rates in general?
9. Define force of mortality.
10. Define stationary population.
11. Define stable population.
12. Define the  $L_x$  column in a life table.
13. Define crude birthrate.
14. Name different types of fertility rates.
15. What is general fertility rate?
16. Fertility rates mainly depend on \_\_\_\_\_.  
( Fill in the blank )
17. Name different measures of population growth.
18. The relation between NRR and GRR is \_\_\_\_\_.  
( Fill in the blank )

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( Continued )

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19. NRR = 1 leads one to conclude that \_\_\_\_\_.  
( Fill in the blank )
20. The main drawback of gross reproduction rate is \_\_\_\_\_.  
( Fill in the blank )

SECTION—B

Answer any five of the following questions :  $2 \times 5 = 10$

21. Write a note on the population composition.
22. What is a good dependency ratio for a country?
23. How can one calculate the crude death rate?
24. In what sense specific death rates are better than the crude death rate?
25. Give the concept of a life table.
26. What is revealed by a life table?
27. How can general fertility rate be determined?

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28. State the reason why age-specific fertility rate is better than general fertility rate.
29. Discuss gross reproduction rate.
30. What are the drawbacks of net reproduction rate?

SECTION—C

Answer any *five* of the following questions :  $5 \times 5 = 25$

31. Write the causes and consequences of errors in demographic data.
32. Why is the demographic balancing equation important?
33. What purpose is served by standardized death rates and how are they calculated?
34. Define and discuss age specific death rates.
35. How can a life table be constructed?
36. What are various uses of life table?

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37. Define and formulate total fertility rate.
38. Discuss general fertility rate.
39. Comment on the values of net reproduction rate.
40. What improvement is brought out by net reproduction rate over gross reproduction rate?

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