



**2023/TDC (CBCS)/EVEN/SEM/
STSHCC-403T/272**

TDC (CBCS) Even Semester Exam., 2023

STATISTICS

(Honours)

(4th Semester)

Course No. : STSHCC-403T

(Statistical Quality Control and Index Number)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

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

SECTION—A

Answer any *ten* of the following : 2×10=20

1. What is meant by 'statistical quality control'?
Explain the terms 'chance causes of variation' and 'assignable causes of variation'.

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(2)

2. Define the terms 'control limits' and 'specification limits'.
3. What are control charts? Give a very brief description.
4. What are the control charts for variables? Write down the control limits for them.
5. What are control charts for attributes? Write down the control limits of any one chart for attributes.
6. Explain briefly the usefulness of *R*-chart. When is *S*-chart used in place of *R*-chart?
7. What are acceptance sampling plans?
8. Define 'producer's risk' and 'consumer's risk'.
9. Define the term 'LTPD'.
10. Define an index number. How do you select the base period for an index number?
11. How are index numbers constructed by the simple aggregate method?

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(Continued)

(3)

12. Define Laspeyres' and Paasche's index numbers.
13. Give the steps in the construction of chain-base index numbers.
14. Show that Fisher's index number satisfies the time reversal test.
15. Briefly describe two limitations of index numbers.

SECTION—B

Answer any five of the following questions : 6×5=30

16. (a) What are the uses of control charts? 3
(b) What is meant by rational sub-grouping? Explain. 3
17. (a) What are the major parts of a control chart? Briefly explain. 3
(b) Write down some sources of variation due to (i) chance causes and (ii) assignable causes. 3
18. Describe the \bar{X} -chart, *R*-chart and how the control limits are set for these charts. 6

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(4)

19. (a) What do you understand by control chart for fraction defective? Explain its construction. 3
- (b) Give the theoretical distribution on which the control limits of fraction defectives are based. How will you interpret a p -chart, particularly the points above the upper control limit and below the lower control limit? 3
20. (a) What are ASH and ATI? Explain briefly. 3
- (b) Show that $ATI = n + (M - n)[1 - L(p)]$, symbols hold their usual meanings. 3
21. (a) Describe the single-sampling plan. 3
- (b) How do you determine the producer's and consumer's risks in a single-sampling plan? 3
22. (a) "Index numbers are economic barometers." Elucidate. 3
- (b) Discuss the problem of construction of index numbers for (i) selection of commodities and (ii) selection of type of average. 3

(5)

23. Define the following index numbers and discuss their merits and demerits : 6
- (a) Laspeyres' index number
- (b) Paasche's index number
- (c) Fisher's ideal index number
24. What is consumer price index or cost of living index number? Describe the main steps involved in the construction of consumer price index number. 6
25. What are chain-base index numbers? Describe the steps involved in the construction of chain-base index numbers. How are chain-base indices converted to fixed-base index numbers? 6
