



Reg. No. :

Name :

VI Semester B.Sc. Degree (CBCSS – Supple./Improv.) Examination, April 2022
(2016 – 2018 Admissions)

CORE COURSE IN STATISTICS

6B11 STA : Time Series, Index Numbers and Vital Statistics

Time : 3 Hours

Max. Marks : 48

Instruction : Use of calculators and statistical tables are permitted.

**PART – A
(Short Answer)**

Answer **all** the 6 questions. (6×1=6)

1. Define time series.
2. What are the components of a time series ?
3. Distinguish between simple and weighted index numbers.
4. What is consumer price index number ?
5. Define the term 'Vital Statistics'.
6. Define force of mortality.

**PART – B
(Short Essay)**

Answer **any 7** questions. (7×2=14)

7. Explain how the principle of least squares is used to estimate trend in a time series.
8. Explain the simple average method of measuring seasonal variations.
9. What are the uses of index numbers ?
10. Define Laspeyre's and Paasche's index numbers.
11. Explain the purpose and procedure for standardising death rates.

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12. Distinguish between gross and net reproduction rates.
13. Define life table. What are the uses of life table ?
14. Explain the difference between complete and abridged life table.
15. Explain Makeham's Graduation Formula.

**PART – C
(Essay)**

Answer **any 4** questions. (4×4=16)

16. Explain the link relative method of measuring seasonal variations.
17. Fit an exponential trend $y = ab^x$ to the following data by the method of least squares.

Year	1911	1921	1931	1941	1951	1961	1971
Sales (Crores Rs.)	25.0	25.1	27.9	31.9	36.1	43.9	54.7

18. Explain time reversal test and factor reversal test.
19. Distinguish between fixed base and chain base index numbers. What are their respective merits and demerits ?
20. What do you mean by fertility of a population ? Define :
i) Crude Birth Rate and
ii) General Fertility Rate.
21. Define Total Fertility Rate. Give its advantages.

**PART – D
(Long Essay)**

Answer **any 2** questions. (2×6=12)

22. Calculate seasonal variation by ratio to trend method for the following data.

Year	Q1	Q2	Q3	Q4
1989	30	40	36	34
1990	34	52	50	44
1991	40	58	54	48
1992	54	76	68	62
1993	80	92	86	82



23. What are the problems involved in the construction of an index number ?
24. Compute the crude and standardised death rates of the two populations A and B regarding A as standard population, from the following data :

Age group (Years)	A		B	
	Population	Deaths	Population	Deaths
Under 10	20,000	600	12,000	372
10 – 20	12,000	240	30,000	660
20 – 40	50,000	1250	62,000	1612
40 – 60	30,000	1050	15,000	525
Above 60	10,000	500	3,000	180

25. Given the following table for l_x , the number of rabbits living at age x , complete the life table for rabbits.

x	0	1	2	3	4	5	6
l_x	100	90	80	75	60	30	0

X, Y, Z are three rabbits of age 1, 2 and 3 years respectively. Find the probability that

- i) At least one of them will be alive for one year more.
- ii) X, Y, Z will be alive for two years time.