LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

SECOND SEMESTER – **NOVEMBER 2022**

UST 2502 – APPLIED STATISTICS

Date: 03-12-2022 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

SECTION – A

Answer **ALL** the questions **10 x 2 = 20 Marks**

1. Define an index number and state the criteria for selecting the base period.
2. Show that Kelly's index satisfies the circular test.
3. Define index of reliability.
4. Write a note on Z (or σ) scores.
5. Provide two merits and demerits each of Crude death rate.
6. Define stationary and stable populations.
7. Write any two uses of Time series.
8. Write the normal equations for fitting a straight line .
9. The demand curve and the supply curve of a commodity are given by $d = 19 - 3p - p^2$ and $s = 5p - 1$. Find the equilibrium price and the quantity exchanged.
10. Define partial and cross elasticity of demand.

SECTION – B

Answer any **FIVE** questions **5 x 8 = 40 Marks**

11. Explain the named weighted aggregative price index numbers.
12. Show that Fisher's index satisfies the time and factor reversal tests.
13. Explain the methods of measuring trend in time series.
14. The population figures of India are given below:

Census year (t) :	1911	1921	1931	1941	1951	1961	1971
Population (in Crores):	25.0	25.1	27.9	31.9	36.1	43.9	54.7

Fit a trend line of the form $y = a + bt$ to the above data by the method of least squares and find the trend values.

15. Explain the different types of fertility rates.
16. Write the assumptions , description and construction of life tables.
17. Five problems are solved by 15%, 34%,50%,62% and 80% respectively of a large unselected group. If the zero point of ability in this test is taken to be at -3σ, what is the σ-value of each problem as measured from this point ?
18. Explain Pigou's method (From Time series data) of estimating demand function.

SECTION – C

Answer any **TWO** questions **2 x 20 = 40 Marks**

19. Find price and quantity index numbers due to Laspeyre , Paasche ,Marshall-Edgeworth, Fisher.

Commodity	Price(1996)	Quantity(1996)	Price(2006)	Quantity(2006)
A	22	10	42	8
B	52	12	62	7
C	42	17	52	17
D	22	22	22	27

20. Using Ratio-to-Trend method , determine the quarterly seasonal indices for the following data. The data are the average price of onion per k.g.

Year / Quarter	I	II	III	IV
2015	35	45	41	39
2016	39	55	55	49
2017	45	55	59	53
2018	59	81	73	67
2019	85	97	91	87

21.(a) Explain the following:

(i)Crude death rate (ii)Specific death rate (iii)Age specific death rate

(iv)Infant mortality rate (v)Standardized death rates (5x2=10)

(b) Complete the following life table:

Age (in years)	l_x	d_x	p_x	q_x	L_x	T_x	e_x^0
4	95000	500	?	?	?	4850300	?
5	?	400	?	?	?	?	?

(10)

22. Explain the methods of determining test reliability. (5 x 4 = 20)

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