

(b) Define the following measure : 6,6

(i) Crude Birth Rate

(ii) Age Specific Death Rate

(iii) Infant Mortality Rate

(iv) General Fertility Rate.

This question paper contains 8 printed pages] ^{20/5/17} Evenings ^{Saturday}

Roll No.

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S. No. of Question Paper : 2764

Unique Paper Code : 32375902 GC-4

Name of the Paper : Applied Statistics

Name of the Course : Statistics : Generic Elective for Honours

Semester : IV

Duration : 3 Hours Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt six questions in all.

Question No. 1 is compulsory.

Select two questions from Section A and three from Section B.

Use of simple calculator is allowed.

1. (a) Explain which component of time series is mainly associated in the following cases :

(i) Fire in a factory.

(ii) Decrease in the employment in a sugar factory.

(iii) Sale of woolen garments during winter season.

(iv) Fall in death rate due to advancement in medical science.

(v) An era of prosperity.

(b) What do you understand by Statistical Quality Control ? Discuss briefly its need and utility in industries.

(c) Prove that Fisher's ideal index number lies between Laspeyre's and Paasche's index number. $3 \times 5 = 15$

Section A

2. (a) Explain time reversal test and factor reversal test. Verify that Fisher's index number satisfies both the tests for the following data :

7. (a) Compute the standardized death rate for the following data :

Age Group	Population of	Deaths in	Standard
Years	District A	District A	Population
0—5	1,000	50	10,000
5—10	800	20	8,000
10—25	1,200	12	12,000
25—45	3,000	15	30,000
45 and above	4,000	52	40,000

(b) Explain the term Vital Statistics. Explain the use and methods of obtaining vital statistics. 6.6

8. (a) Fill in the blanks of the following table which are marked with :

x	l_x	d_x	p_x	q_x	L_x	T_x	e_x°
20	693,435	?	?	?	?	35081126	?
21	690,673	—	—	—	—	?	—

where the symbols have their usual meanings.

6. (a) Define product and process control. Distinguish between chance causes and assignable causes of variation in the quality of product.

(b) Construct the control chart for fraction defectives for the following data : 6,6

Lot Number	No. of Inspected	No. of Defectives
1	500	25
2	400	42
3	300	35
4	150	16
5	600	15
6	450	40

Commodity	Price		Quantity	
	2002	2003	2002	2003
A	10	12	12	15
B	7	5	15	20
C	5	9	24	20
D	16	14	5	5

(b) Define cost of living index number. What are its uses ? Describe the aggregate expenditure method for its construction. 6,6

3. (a) The consumption of electricity in the industrial sector during the period 2001-2007 was recorded as given below :

Year	Consumption (units in 000's)
2001	70
2002	85

2003	82
2004	75
2005	65
2006	90
2007	95

- (i) Fit a straight line trend.
- (ii) Estimate the consumption of electricity in the year 2008.

- (b) What do you mean by seasonal variation in a time series? Describe Ratio to trend method to compute the seasonal indices. 6,6

4. (a) Define the following Index numbers :

- (i) Laspeyre's Price Index Number
- (ii) Paasche's Price Index Number

- (iii) Marshall-Edgeworth's Quantity Index Number

- (iv) Value Index Number.

- (b) Mention the different types of mathematical curves which are used in fitting trends to economic data series. Indicate the procedure for fitting an exponential trend $Y = ab^t$ to a time series. 6,6

Section B

5. (a) Define the terms :

- (i) Control Limits
- (ii) Specification Limits
- (iii) Tolerance Limits.

- (b) Describe control limits of \bar{X} charts when :

- (i) standards are given
- (ii) standards are not given. 6,6