6 SEM TDC STS M 2

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(May)

STATISTICS

(Major)

Course : 602

(Applied Statistics)

<u>Full Marks</u> : 80

<u>Pass Marks</u> : 32

Time : 3 hours

The figures in the margin indicate full marks
for the questions

1. Choose the correct alternative out of the given ones : 1×8=8

    (a) The CSO was set up by the Government of India in

    (i) 1947

    (ii) 1951

    (iii) 1956

    (iv) 1961

(Turn Over)

(b) The main source of population statistics in India is

(i) the census

(ii) the SRS

(iii) the vital registration system

(iv) None of the above

(c) In cyclical fluctuations, the period of oscillation is

(i) more than a year

(ii) less than a year

(iii) at least three years

(iv) None of the above

(d) The condition for the price indices to satisfy the circular test for four years data is

(i) $P_{01} \, P_{12} \, P_{23} \, P_{30} = 1$

(ii) $P_{01} \, P_{12} \, P_{23} \, P_{34} = 1$

(iii) $P_{01} \, P_{12} \, P_{23} \, P_{43} = 1$

(iv) $P_{12} \, P_{23} \, P_{34} = 1$

(e) If income elasticity of demand $\eta_y < 0$, then the goods are

(i) called inferior

(ii) luxury for life

(iii) necessity for life

(iv) None of the above

(f) The faults due to assignable causes
  (i) can be removed
  (ii) cannot be removed
  (iii) can sometimes be removed
  (iv) All of the above

(g) Infant mortality rate is an age specific death rate for infants under the age of
  (i) 1 year
  (ii) 5 years
  (iii) 10 years
  (iv) None of the above

(h) If a percent change in quantity demanded is greater than the percent change in price, then the elasticity of demand is
  (i) perfectly elastic
  (ii) elastic
  (iii) inelastic
  (iv) perfectly inelastic

2. Answer the following in brief :   2×8=16
  (a) What purpose is served by analyzing a time series?
  (b) Mention the shortcomings of moving averages for determining trend.
  (c) Prove that Fisher's ideal index number lies between Laspeyres's and Paasche's index number.

(d) What do you mean by consumer price index number?

(e) Define GRR and NRR.

(f) Write two uses of life table.

(g) Define producer's risk and consumer's risk.

(h) What do you understand by acceptance sampling procedure?

3. Answer any *two* questions : 5×2=10

(a) What is a time series? What are its main components? Give illustrations for each of them. 1+1+3=5

(b) What are the commonly used models in a time series analysis? Discuss the underlying assumptions of each model. 1+4=5

(c) Discuss how to fit an equation of the form

$$y = a + bX + cX^2$$

using OLS method. 5

4. Answer any *two* questions : 5×2=10

(a) What is an index number? Explain the various problems involved in the construction of index number. 1+4=5

(b) What is base shifting? Why does it become necessary to shift the base of index numbers? Give an example of the shifting of base of index numbers.

1+3+1=5

(c) A textile worker in the city of Mumbai earns ₹ 3,500 per month. The cost of living index for a particular month is given as 136. Using the following data, find the amounts he spent as house rent and clothing :

5

Group	Expenditure	Group Index
Food	1,400	180
Clothing	—	150
House rent	—	100
Fuel and lighting	560	110
Miscellaneous	630	80

5. Answer any *two* questions : 5×2=10

(a) What do you understand by SQC? Discuss briefly its need and utility in industry.

1+4=5

(b) Distinguish between defect and defectives. Give some examples of defects for which C chart is applicable. Discuss the assumptions involved in the calculations.

1+3+1=5

(c) What do you understand by sampling inspection plans? How are they used in controlling the quality of a manufactured product? $2+3=5$

6. Answer any *two* questions : $5×2=10$

(a) "CDRs are not suitable for comparing the mortality situations of two places." Justify this with examples. Discuss the method of construction of the death rate which is generally adopted for the comparison of mortality situations of two different places. $2½+2½=5$

(b) What are the different measures of fertility? Out of the age specific fertility and general fertility rates which one do you think better represents the general fertility situation of a place and why?

$3+2=5$

(c) Describe the following terminology in the connection of a complete life table : 5

(i) L_x

(ii) T_x

(iii) d_x

(iv) e_x

(v) e_x^0

7. Answer any *one* question : 8

(a) Discuss about the various functions of NSSO in India. Name one of its important publications. $7+1=8$

(b) What are the statistical offices in India at State level and what are the functions of these offices? 4+4=8

8. Answer any *one* question : 8

(a) Describe briefly the concepts of market equilibrium and consumer's surplus. If a consumer's demand function is given by

$$Q = \sqrt{60 - 2P}$$

find the consumer's surplus when market price $P = 12$. 2+2+4=8

(b) Define price and income elasticities of demand of a commodity. Given a demand function of Engel's curve type

$$D = A \cdot P^{\alpha} I^{\beta}$$

where D is demand, P is price, I is income and A, α, β are parameters. Find the partial derivatives

$$\frac{\partial D}{\partial P} \text{ and } \frac{\partial D}{\partial I}$$

and also interpret the values of α and β. 4+2+2=8

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