

2008

BASIC STATISTICS

[1st Semester]

PAPER—1102

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks

*Candidates are required to give their answers in their
own words as far as practicable*

Illustrate the answers wherever necessary

Notations have their usual meaning

UNIT—I

[Marks : 20]

1. Answer any *two* questions :

5 × 2

(a) Give the classical definition of probability. What are its limitations ?

5

(b) There are 3 children in a family. What is the probability that they include (i) exactly 2 girls, (ii) not more than one girl ?

$$2 \frac{1}{2} + 2 \frac{1}{2}$$

(c) Equations of two lines of regression are :

$$4x + 3y + 7 = 0 \text{ and } 3x + 4y + 8 = 0.$$

Find (i) regression coefficients b_{yx} and b_{xy}

(ii) the correlation coefficient r_{xy} .

3 + 2

(d) In a three-variate multiple correlation analysis, the following results were found :

$$\sigma_1 = 1, \sigma_2 = 0.8, \sigma_3 = 9,$$

$$r_{12} = 0.6, r_{13} = 0.7, r_{23} = 0.65.$$

Compute: (i) $r_{31.2}$ and (ii) $b_{31.2}$.

$$2 \frac{1}{2} + 2 \frac{1}{2}$$

2. Answer any *one* question:

10 × 1

(a) (i) What do you understand by conditional and unconditional probability?

(ii) A box contains two types of defective dice in equal numbers. The probability of getting a 'six' from the type-I dice is 0.4 and from type-II dice is 0.6. If one dice is drawn from the box at random and rolled once, and comes up 'six', what is the probability that it is a type-I dice. If the same dice is rolled second time and again comes up a 'six', then revise your earlier probability. 3 + 7

(b) Applying Kendall's coefficient of concordance (W), find the degree of relationship among skill, intelligence and

knowledge of employees in a factory from the following data :

Employee								
(Identity								
Card No.):	61	62	63	64	65	66	67	68
Skill-score:	0.85	0.82	0.90	0.30	0.45	0.70	0.72	0.70
Intelligence								
-score:	0.65	0.32	0.65	0.30	0.42	0.65	0.30	0.60
Knowledge								
-score:	0.80	0.81	0.73	0.62	0.73	0.62	0.45	0.40

Also interpret the result. 10

UNIT—II

[Marks : 20]

3. Answer any two questions: 5 × 2

(a) Show that the Paasche's index formula is the weighted harmonic mean of the price relative where weight is the current year value.

- (b) Examine whether Fisher's ideal index number satisfies the Time Reversal and Factor Reversal Tests.
- (c) How would you fit the trend equation $y = at^b$ to a time series by the method of least squares?
- (d) Find chain base indices from the data given below:

<u>Year</u>	<u>Price (Rs.)</u>
2003	37
2004	39
2005	43
2006	48
2007	52
2008	49

4. Answer any *one* question:

10 x 1

(a) (i) If $\delta = (AB) - (AB)_0$, show that

$$\delta = \frac{1}{N} [(AB)(\alpha\beta) - (A\beta)(\alpha B)].$$

(ii) 600 workers appeared in a selection test for promotion and 180 of them were successful. 105 workers received special training and out of them 60 were successful. Using Yule's coefficient of association estimate the utility of special training. 4 + 6

(b) (i) Give an example of each trend component and seasonal component in time series.

(ii) Fit a quadratic trend to the following data :

Year : 2003 2004 2005 2006 2007

Average
Production

('000 tons) : 37 38 40 41 45

2 + 8

[*Internal Assessment* — 10 Marks]
