2009

M. Com.

1st Semester Examination

BASIC STATISTICS

PAPER — CM-1102

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Notions have their usual meaning.

Unit—I

[Marks : 20]

1. Answer any *two* questions : 5×2

(a) A class consists of 50 students, 20 of them are girls and 30 boys, 10 of them are rich and remaining poor, 5 of them are fair complexioned, 3 are intelligent. What is the probability of selecting a fair complexioned rich intelligent girl ?

(b) (i) Distinguish between Mutually Exclusive Events and Independent Events.

(ii) Explain the term 'Conditional Probability'.

(c) Show that Spearman's rank correlation coefficient γ_R lies between –1 and +1.

(d) In calculation of correlation coefficient of 3 variable x_1, x_2 and x_3 the following data are obtained :

$r_{12} = 0{\cdot}6$, $r_{23} = 0{\cdot}8$, $r_{31} = -0{\cdot}5$

Are the above data consistent ?

2. Answer any *one* questions : 10×1

(a) (i) Show that the coefficient of Determination (γ^2) is given by :

$$\gamma^2 = \frac{\sigma_y^2}{\sigma_y^2}$$

(ii) Ten hand writings were ranked by two judges in a competition. The ranks are given below :

Competitor :	A	B	C	D	E	F	G	H	I	J
Rank of Judge–I :	7	9	8	1	4	6	2	4	10	4
Rank of Judge–II :	10	8	6·5	1·5	6·5	5	1·5	4	9	3

Calculate Kendall's Coefficient of Rank Correlation (τ).

(b) A company has two plants to manufacture scooters. Plant I manufactures 80% of the scooters and plant II manufactures 20%. At plant I, 85 out of 100 scooters are rated standard quality or better. At plant II, only 65 out of 100 scooters are rated standard quality or better.

(i) What is the probability that the scooter selected at random came from plant I if it is known that, the scooter is of standard quality ?

(ii) What is the probability that the scooter came from Plant II if it is known that the scooter is of standard quality? 10

Unit—II

[Marks : 20]

3. Answer any *two* questions : 5×2

(a) Write name of the components of the *following items in Time Series and Justify your answer.*

(i) Increase in sales of garments in Durga Puja.

(ii) Decrease in sales of food grains due to economic recession.

(iii) Increase in sales of computer due to use of more computers by the people.

(b) There were 500 students in M.Com. Part–I of Vidyasagar University under distance education mode. Their results in various terminal examinations are given below :

300 Passed in first terminal

160 Passed in second terminal

200 Passed in third terminal

80 Passed in all terminals

100 failed in all terminal

50 Passed in first and second terminals but failed in the third terminal, 60 failed in the first and second terminals but passed in third terminal.

Using Association of Attribute concept find out how many students passed at least two examinations.

(c) Examine whether Laspayres' index satisfies the time reversal and factor reversal tests.

(d) How would you fit the trend equation $y = ab^t$ to a time series by the method of least squares?

4. Answer any *one* question : 10×1

(a) (i) You are given that

$y = 50 + 2t + \cdot 5t^2$

(origin : year 2005

Scale : 1 year)

Shift the origin of the above equation to year 2008.

(ii) Fit a straight line trend for the following series and estimate the value for 2011

Year	2003	2004	2005	2006	2007	2008
Production of steel (m. tones)	60	72	75	65	80	85

(b) Calculate quantity index numbers for 2009 by using :

(i) Simple aggregative method;

(ii) Weighted aggregative method and

(iii) Kelly's method :

Item	*Weight*	*Qantity*	
		2009	*2007*
A	20	100	160
B	7	200	220
C	15	50	60
D	18	20	40
E	20	10	20

[Internal Assessment : 10 Marks]