2010

M. Com.

1st Semester Examination

BASIC STATISTICS

PAPER — COM-102

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 of the following : 2×5

(a) Define 'classical probability'. State its limitations. 2+3

(b) Show that when events A and B are independent —

(i) A^1 and B^1

(ii) A^1 and B are also in dependent. $2\frac{1}{2}+2\frac{1}{2}$

(c) For linear regression show that
TSS = ESS + Unexplained SS.

(d) Distinguish between simple correlation, partial correlation and multiple correlation.

2. Answer any *one* questions : 1×10

(a) (i) What does the term 'partial regression coefficient' imply ?

(ii) Eight students got the following percentage of marks in Human Resource Accounting (HRA), Inflation Accounting (IA) and Environmental Accounting (EA) at M. Com. Examination :

Student Roll No. :	1	2	3	4	5	6	7	8
Marks in HRA :	85	82	90	30	45	70	72	68
Marks in IA :	80	81	73	62	73	62	45	40
Marks in EA :	65	32	65	30	42	65	30	60

Calculate Kendall's Coefficient of concordance and interpret the result. 3+7

(b) (i) For Boole's Inequality, show that —

$$P\left(\bigcup_{i=1}^{n} A_i\right) \leq \sum_{i=1}^{n} P(A_i)$$

(ii) Three urns contain, respectively, 4 white, 2 black balls; 2 white, 4 black balls; and 3 white, 3 black balls. One of the urns is chosen on the results of two throws of a coin : the first urn if head appears on each throw, the second urn if tail appears on each throw, and the third urn in case head appears on one throw and tail on the other. Finally, a ball is drawn at random from the chosen urn. What is the probability for the ball being white ? 4+6

Unit—II

[Marks — 20]

3. Answer any *two* questions : 2×5

(a) (i) Convert the following into annual trend equation.

$Y = 96 + 2.4t$ (origin : Jan. 2010, t unit = 1 month, Y = Monthly production in thousand)

(ii) Suppose that the secular trend of sales of a company is described by the equation.

$Y = 80{,}000 + 800t$ where 't' represent a period of one month and has a value 0 in December, 2010 the seasonal index for the month of July 120.

Ignoring cyclical and random influences, forecast sales for July, 2012. 3+2

(b) An index number is at 100 in year 2000. It rises by 12% in 2001 and falls 5% in 2002 over 2001. The link relative in 2003 was 90, In this year a new series was started. This new series rose by 15% by next year. During 2007 the price level was only 8% higher than 2005 and in 2005 they were 5% higher than 2004. Splice the two series. 5

(c) Show that :

$$\delta = \frac{1}{N}\left[(AB)(\alpha\beta) - (A\beta)(\alpha B)\right] \text{ if}$$

$$\delta = (AB) - (AB)_0 .$$ 5

(d) In a certain investigation carried on with regard to 500 graduates and 1500 non-graduates, it was found that the number of employed graduates was 450 while the number of unemployed non-graduates was 300. In the second investigation 5000 cases were examined. The number of non-graduates was 3000 and the number of employed non-graduates was 2500.

The number of graduates who were found to be employed was 1600.

Calculate the degree of relationship between graduation and employment in both the investigations.

Can any definite conclusion be drawn from the coefficient ? 5

4. Answer any *one* question : 1×10

(a) The number of traffic accidents in Kolkata in four quarters of a year during the period 2008–10 are given below :

	Quarters			
Year	*I*	*II*	*III*	*IV*
2008	170	130	145	180
2009	150	120	125	160
2010	145	110	105	150

Find seasonal indices by Trend-ratio method assuming a linear trend for the date.

(b) (i) Prove that Edgeworth-Marshal Index number formula lies between Laspeyer's and Paasches Index number formula.

(ii) Determine the relative importance of Fuel group, given that the Cost of Living Index number for 2009 with 2000 as base is 195 from the following figures :

Group	*% increase in expenditure*	*Weight*
Food	80	50
Clothing	60	10
Fuel	20	?
Rent	120	20
Miscellaneous	75	10

4+6

[Internal Assessment : 10 Marks]