2015

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.

Unit—I

[*Marks : 20*]

1. Answer any *two* questions from the following : 2×5

(a) What is a scatter diagram ? With the help of a scatter diagram derive the formulae of Pearson's product-moment correlation coefficient. 1+4

(b) Distinguish between simple correlation, partial correlation and multiple correlation. 5

(c) John is playing the game of Auction Bridge with his friends. John has equally distributed 52 well shuffled cards among themselves. After distributing the cards if John holds two kings, find the probability that his partner is also holding two kings. 5

(d) Define classical probability. State its limitations. 1+4

2. Answer any *one* question from the following : 1×10

(a) (i) Write down the important properties of simple linear regression.

(ii) A sample of twelve fathers and their eldest adult sons gave the following data about their height in inches :

Father	65	63	67	64	68	62	70	66	68	67	69	71
Son	68	66	68	65	69	66	68	65	71	67	68	70

Calculate the exact value of Spearman's rank correlation coefficient (r_R) between height of father and height of son. 4+6

(b) (i) State and prove Bayes' theorem of posterior probability.

(ii) The chance that Dr. Sen, a cardiologist, will diagnose a heart disease correctly is 0.60. The chance that a patient will die by his treatment even the diagnosis is correct is 0.40 and the chance of death by his wrong diagnosis is 0.7. A patient of Dr. Sen who had heart disease died after the treatment. Find the probability that he was correctly diagnosed by Dr. Sen. 4+6

Unit—II

[Marks : 20]

3. Answer any *two* questions from the following : 2×5

(a) Prove that Paasche's Price Index is the weighted harmonic mean of Price Relative, where weight is the current year's value. 5

(b) Identify the component's name of the following items in Time Series and justify your answer : 5×1

(i) Increase in sales of Gold during Dhanterous ;

(ii) Increase in Potato export from India to Afghanistan due to war in Afghanistan ;

(iii) Increase in sales of Laptop day by day ;

(iv) Decrease in employment in India due to economic recession ;

(v) Increase in withdrawl of money from bank in 1st week of any month.

(c) Out of 3000 unskilled workers of a factory, 2000 come from rural areas and out of 1200 skilled workers, 300 come from rural areas. Determine the association between skill and residence by the method of Yule's Co-efficient. 5

(d) At a competitive examination at which 600 graduates appeared, boys exceeded girls by 96. Those qualifying for interview exceeded in number than those failing to qualify by 310. The number of science graduate boys interviewed was 300; while among the arts girls there were 25 who failed to qualify for interview. Altogether there were only 135 arts graduates and 33 among them failed to qualify. Boys who failed to qualify were 18. Using Association of attribute, find out the number of boys who qualified for interview and the total number science graduate boys appearing. 2+3

4. Answer any one of the following : 1×10

(a) (i) you are given that :

$Y = 480 + 10t + .8t^2$

(Origin 2014, t unit = 1 year, Y = Annual Production of sugar in tones)

Shift the origin to year 2010.

(ii) Given the following equation :

$Y = 240 + 3.8t$

(Origin year 2012, t unit = 1 year, y = Annual Production of Rice)

Shift the origin to 2013-14.

(iii) Fit a straight line equation from the following information and also estimate the sales for the year 2017-18 :

Year	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Sales (Rs.Crore)	30	38	32	36	34	40

2+2+6

(b) (i) Compute the chain index number with 2010 prices as base from the following table giving the average wholesale prices of the commodities Wheat, Rice and Dal for the years 2011-2015 :

Average Wholesale Price (*in rupees*)

Commodity	*2011*	*2012*	*2013*	*2014*	*2015*
Wheat	20	16	28	35	21
Rice	25	30	24	36	45
Dal	20	25	30	24	30

(ii) With the help of the data given below calculate the price index numbers by (i) Paasche's method, (ii) Laspeyer's method, (iii) Marshall-Edgeworth formula, (iv) Fisher's formula and (v) Drobish-Bowley's formula :

Commodity	2010		2014	
	Price (in Rs.)	Value (in Rs.)	Price (in Rs.)	Value (in Rs.)
A	20	160	40	240
B	50	500	60	300
C	40	600	50	500
D	20	400	20	300

5+5

[*Internal Assessment : 10*]