

M.Com. 1st Semester Examination, 2019

COMMERCE

PAPER—COM-102

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

Write the answers to questions of each Unit in separate books

UNIT – I

(Business Statistics)

[Marks : 20]

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

(a) State the properties of simple correlation coefficient (r).

(b) In case of perfect disagreement between two series ranks, show that the value of Spearman's rank correlation coefficient (r_R) is equal to -1 .

(c) What do you understand by mutual independence of n events ?

(d) If four cards are drawn from a well shuffle pack of 52 cards then find the probability that those will be of four different suits.

2. Answer any *two* of the following questions : 4×2

(a) State the different problems that may immerge in case of classical regression. Briefly explain any one of them. 1 + 3

(b) Write a brief note on subjective probability. 4

- (c) If two dices are rolled at a time, find the probability that you will get more than 8 points on the upper faces of the two dices. Find also the probability that the sum of the points on the upper faces of two dices will not be 7 or 11. 2 + 2
- (d) If coefficient of correlation between two variables X and Y is 0.72, then what percentage of variation of Y remains unexplained, when we fit a regression equation of Y on X on this dataset? For another regression equation of Y on X , given that variation of Y remains unexplained 22.26 and variation explained is 32.66. Find the value of correlation coefficient between X and Y . 2 + 2

3. Answer any *one* of the following questions : 8×1

- (a) In a study of a random sample of 200 graduate students of Commerce regarding their percentage of marks in Part I (X_1), Part II (X_2), and Part III (X_3) examinations, it is found that —

$\bar{X}_1 = 58$	$\bar{X}_2 = 62$	$\bar{X}_3 = 72$
$S_1 = 9$	$S_2 = 8$	$S_3 = 5$
$r_{12} = 0.65$	$r_{13} = 0.72$	$r_{23} = 0.68$

Required :

- (i) Obtain the least square regression equation of X_3 on X_1 and X_2
- (ii) Compute $r_{3.12}$
- (iii) Estimate the percentage of marks of a student in Part III if he gets 62% in Part I and 66% in Part II. 4 + 2 + 2
- (b) (i) State and prove Bayes' theorem of inverse probability.
- (ii) A company has two plants to manufacture bikes. Plant I manufactures 70% of the bikes and Plant II manufactures 30% of the bikes. At Plant I, 85 out of 100 bikes are rated as standard quality. At Plant II, 75 out of 100 bikes are rated as standard

quality. You have purchased one bike manufactured by the same company and found that it is not in standard quality. What is the probability that the bike was manufactured in Plant II ? 3 + 5

UNIT – II

(*Basic Statistics*)[*Marks : 20*]

4. Answer any *two* questions : 2 × 2

(a) Suppose that the secular trend of sales of a company is described by the equation $Y = 240000 + 1200t$, where ' t ' represent a period of 1 month and has a value '0' in December, 2018. The seasonal index for the company's sales in the month of May is 120. Forecast Sales for May, 2020 (Ignore cyclical and random influences).

(b) You are given the following parabolic equation :

$$Y = 480 + 1.6t + .5t^2$$

(origin : year 2017; t unit = 1 year)

Shift the origin of the above equation to year 2019.

- (c) Write the uses of Newton's Backward Interpolation formula.
- (d) From the following ultimate class frequencies, construct the Nine Square Table in association of attribute

$$(AB) = 100, (\alpha B) = 80, (A\beta) = 50, (\alpha\beta) = 40$$

5. Answer any *two* questions : 4 × 2

- (a) Show that Fisher's Price Index formula satisfies both the Time Reversal Test and Factor Reversal Test.

(b) If $\gamma = \frac{1 - \sqrt{x}}{1 + \sqrt{x}}$, where $x = \frac{(A\beta)(\alpha B)}{(AB)(\alpha\beta)}$

then show that

$$Q = \frac{2\gamma}{1 + \gamma^2}$$

where Q = Yule's co-efficient of association
 γ = Co-efficient of colligation.

(c) If U is any function of x , and given that

$$U_0 + U_8 = 52 \quad U_2 + U_6 = 40$$

$$U_1 + U_7 = 38 \quad U_3 + U_5 = 36$$

Find the value of U_4 .

(d) From the following data compute Price Index number of the group of four commodities using (i) Laspeyres method (ii) Paaschees method (iii) Edgeworth-Marshall method.

Commodity	2013		2018	
	Price per unit (₹)	Expenditure (₹)	Price per Unit (₹)	Expenditure (₹)
A	2	40	5	75
B	4	16	8	40
C	1	10	2	24
D	5	25	10	60

6. Answer any *one* question : 8 × 1

(a) Calculate the seasonal indices from the following data using Moving Average method :

8

Quarter Year	I	II	III	IV
2016	101	93	79	98
2017	106	96	83	103
2018	110	101	88	106

- (b) (i) Using Newton's interpolation formula, find the number of factories earning less than ₹65,000 as profits, from the following data :

Profit (₹ 000) :	30-40	40-50	50-60	60-70	70-80
No. of factories :	34	43	56	39	29

- (ii) Define entry and argument. Write advantages of Lagrange's Interpolation Formula. 5 + (1 × 2 + 1)

[*Internal Assessment* : 10 Marks]