2022

1st Semester Examination
COMMERCE
Paper : COM 103
(Business Statistics)

Full Marks : 40   Time : Two Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.

COM : 103.1

1. Answer any *two* of the following questions :   5×2=10

   (a) State the properties that the simple correlation
       coefficient (r) follows. What is 'Spurious
       correlation'?   2+3

   (b) For the regression equation of Y on X, show that
       TSS = ESS + UnESS.   5

   (c) Define Classical probability. State its limitations.

                                                        2+3

2. Answer any *one* of the following questions :   10×1=10

   (a) (i) What do you understand by errors in
            regression? Show that the correlation (r_{er})
            between error (e_i) and Y_i is zero.

                                                    P.T.O.

(ii) Eight girls have participated in a beauty competition and they are ranked by two judges as follows —

Girl	A	B	C	D	E	F	G	H
Ranked by Judge I	4	8	1	5	2	6	3	7
Ranked by Judge II	3	7	2	6	4	5	1	8

Compute Kendall's rank correlation coefficient (τ) and interpret the result.

(iii) For the multiple regression equation of X_1 on X_2 and X_3, interpret the partial regression coefficient $b_{13.2}$ 3+5+2

(b) (i) Define Sample space.

(ii) Two urns contain respectively 8 white, 7 black balls and 5 white, 10 black balls. If two balls are randomly transferred from the first urn to the second and then one ball is drawn from the second urn, find the probability of getting a white ball from the second urn.

(iii) Write a brief note on Subjective probability.   2+6+2

COM : 103.2

3. Answer any *two* of the following questions :   5×2=10

(a) (i) What do you understand by cost of living index?

(ii) The following data shows the index number of industrial production —

Year	2014	2015	2016	2017	2018
Index number (base year 2011	112	114	119	132	139

Shift the base from 2011 to 2014 and recast the data.

2+3

(b) Show that Fisher Index number formula satisfies the factor reversal test. 5

(c) The trend equation for a certain production data is $y = 240 + 36x$,

where y = annual production ('000 tons);

x = time; with origin at year 2020, one unit = 1 year.

Estimate the trend value for April, 2023. 5

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

(a) Deseasonalise the following production data by the method of moving average.

	Quarterly output (000 tones)			
Quarters	2015	2016	2017	2018
I	30	50	35	65
II	50	55	60	80
III	50	60	62	65
IV	35	20	30	50

10

P.T.O.

(b) (i) In calculating the Cost of Living Index Number, the following weights were assigned for different items : Food - 15; Clothing - 3; Rent - 4; Fuel and Light - 2; Miscellaneous - 1.

Calculate the Cost of Living Index Number on a date when the average increases in price of items in the various groups over the base period were found to be 30%, 55%, 45%, 80% and 60% respectively.

(ii) Calculate the Quantity Index Number using Fisher's formula for the following data and from such data also show that it satisfies the Time Reversal Test.

Product	2020		2022	
	Price	Quantity	Price	Quantity
A	6	70	10	110
B	8	90	12	100
C	12	140	18	260

4+6