2025

M.COM. 1st Semester Examination

COMMERCE

Paper : COME404A0

(Quantitative Techniques)

Full Marks : 50 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.

Unit-I

Answer any ***two*** questions : 5×2=10

1. (a) State and explain the role of Quantitative Techniques in business and industry.

   (b) What is scatter diagram? With the help of a scatter diagram how do you identify about the correlation between two variables?

   (c) For a regression model of y on x, show that TSS = ESS + Un-ESS.

P.T.O.

Answer any ***one*** question : 10×1=10

2. (a) (i) Two NSS Coordinators ranked 10 NSS volunteer students of V.U. in respect of their devotion towards various NSS programs. Applying Spearman's method, calculate the value of rank correlation coefficient.

	NSS Volunteer									
Ranked by	A	B	C	D	E	F	G	H	I	J
Coordinator 1	6	5	1	2	3	4	7.5	7.5	10	9
Coordinator 2	4	7	3	2	1	5.5	5.5	9	8	10

(ii) Write a brief note on spurious correlation. 7+3

(b) (i) In a study of random sample of 200 post graduate students of Commerce regarding their percentage of marks in Accounts (X_1), Statistics (X_2) and Economics (X_3) it is found that –

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

You are required to obtain the least square regression equation of X_3 on X_1 and X_2.

(ii) Calculate the Variance Inflation Factor (VIF) of a regression model and comment on the multicollinearity problem of the model, if any.

6+1+3

Unit - II

Answer any ***two*** questions : 5×2=10

3. (a) Using Newton's Interpolation formula, find the number of factories earning less than Rs. 45000 as profit.

Profits (Rs. '000)	30-40	40-50	50-60	60-70	70-80
No. of Factories	34	43	56	39	29

(b) 2800 candidates appeared for M.Com 1st semester examination, 2025, of whom 900 were successful. 790 candidates had attended regular offline classes and out of them 650 came out successful. Estimate the utility of offline classes. (Use Yule's Co-efficient of Association).

(c) (i) Establish the relationship between E operator and Δ (Delta) operator in interpolation.

(ii) Find the missing term :

x:	0	1	2	3	4
$f(x)$:	1	3	9	?	81

2+3

Answer any ***one*** question : 10×1=10

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

$Y = 96+2.4t$ (Origin : June, 2025, t unit=1 month, Y unit=Monthly production in thousands)

P.T.O.

(ii) The following data relate to average monthly number of tourists coming to Victoria Memorial, Kolkata in different years. Fit a linear trend by the method of least squares :

Year	2020-21	2021-22	2022-23	2023-24	2024-25
Number of Tourists ('000)	245	260	280	310	350

(iii) Construct indices of seasonal variations from the following time series data on consumption of cold drinks, which contains only seasonal and irregular variations.

Consumption of Cold Drinks ('000 bottles)

Year \ Quarters	I	II	III	IV
2021	90	75	87	70
2022	75	80	78	75
2023	80	75	75	72
2024	85	82	80	81

1+5+4

(b) (i) An enquiry into the budgets of middle class families in a certain city gave the following information :

Group	% increase in expenditure in 2025 compared with 2020	Weight
Food	65	-
Clothing	90	12
Fuel	20	18
Rent	70	20
Miscellaneous	150	10

Determine the relative importance of Food group, given the cost of living index for 2025 with 2020 as base is 175.

(ii) Show that Fisher's Price Index formula satisfies Time Reversal test.

(iii) An index number is at 100 in 2019. It rises 10% in 2020, falls 4% in 2021. In this year a new series started, it increases by 2% in 2022, the link relative of the year 2023 is 98 and index number in 2025 rises by 10% over 2024, the link relative in 2024 is 105. Prepare the index number series with 2022 as base.

3+3+4

Internal Assessment : 10 marks