K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

July - Aug ~~May-June~~ 2025
(B. Tech) Program: Computer Engineering Scheme II-B
Supplementary ~~Regular~~ Examination: TY Semester: VI
Course Code: CEDLC6051 and Course Name: Quantitative Analysis
Date of Exam: ~~29/05/2025~~ 09-08-2025 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Define statistics. Differentiate between statistical method and experimental method.		CO1	U
b)	Find MAE, MSE, RMSE, RMSLE for the following actual and predicted values		CO3	An

Actual (Y)	40	55	65	75	85
Predicted ($\hat{Y}$)	42	50	70	72	80

c)	Describe point estimation properties		CO5	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	What is sampling? List and explain several methods under probability sampling.		CO2	U
b)	Let X_1, X_2, and X_3 be the excess of heights of father, mother, and son, respectively, in 100 samples above their respective mean values in cm. A distribution of these variables gave the following correlation coefficients r_{ij} between X_i and X_j and standard deviations σ_i for i, j = 1, 2, 3. $r_{12} = 0.3$, $r_{23} = 0.4$, $r_{31} = 0.5$ $\sigma_1 = 3$ $\sigma_2 = 2$ $\sigma_3 = 4$ Obtain a regression equation X_1 on X_2 and X_3 and estimate the excess of height of father when excess of heights of mother and son are 0.7 cm and 2.1 cm, respectively.		CO4	An

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c)	A weighing machine without any display was used by an average of 320 persons a day with a standard deviation of 50 persons. When an attractive display was used on the machine, the average for 100 days increased by 15 persons. Can we say that the display did not help much? Use 5% LOS. [Tabulated value: 1.645]		CO6	AP
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Explain several methods for collecting primary data with suitable examples.		CO1	U
b)	In a correlation study, the following values are obtained:		CO3	An

	X	Y
Mean	**65**	**67**
S.D.	**2.5**	**3.5**
Coefficient of correlation (r) = 0.8		

Find the two regression equations that are associated with the above values. What will be the possible value of Y when X is 29?

c)	What is hypothesis testing? Explain types of errors in testing of hypothesis.		CO5	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	i) Present in tabular form with suitable captions the information contained in the following. In 2005, out of total of 2650 workers of a factory, 2100 workers were members of a trade union. The number of women employed was 300 of which 195 did not belong to a trade union. In 2006, the number of union workers increased to 2,610 of which 2,310 were men. On the other hand, the number of non-union workers fell down to 1,306 of which 1,160 were men. In 2007, there were on the pay-rolls of the factory 2600 employees who belonged to a trade union and 150 who did not of all the employees in 2007, 500 were women of whom only 12 did not belong to a trade union. [6M]		CO2	AP

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	ii) Draw a pie diagram from the given data. The selling price of a product contains the following elements of costs and profit [4M]			

Prime Cost	26%
Factory Overhead	20%
Administrative Overhead	28%
Selling and Distribution Overhead	22%
Profit	4%

b)	Explain the concept of multiple regression analysis. How does it differ from simple linear regression?		CO4	U
c)	A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025 cm. A random sample of 10 washers was found to have an average thickness of 0.024 cm with a standard deviation of 0.002 cm. Test the significance of the deviation. [Tabulated Value for 9 degrees of freedom at 5% level is 2.262]		CO6	AP

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