

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

May-June 2026		
(B. Tech) Program: <u>Computer Engineering</u> Scheme III		
Regular Examination: TY Semester: VI		
Course Code: CEDLC6031 and Course Name: Quantitative Analysis		
Date of Exam: 22/05/26	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 and list the limitations of statistics.		CO1	U													
b)	The coefficients of correlation are: $r_{12}=0.59$, $r_{13}=0.46$, $r_{23}=0.77$. Find $r_{12.3}$ and $R_{1.23}$		CO4	Ap													
c)	Define statistical inferences. Explain briefly method of moments.		CO5	U													
Q 2	Solve any two questions out of three: (05 marks each)	10															
a)	In a survey conducted in two villages, X and Y, regarding the use of smartphones, the following information was collected: (consider total population in each village is 1000) Village X: Females were 45%, total smartphone users were 50%, and female non-smartphone users were 18%. Village Y: Males were 60%, male non-smartphone users were 25%, and female smartphone users were 20%. Present the data in a tabular format showing: a) Male and Female population b) Smartphone users and non-users c) Separate totals for each village		CO2	AP													
b)	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	An													
c)	Apply simple linear regression to the given data and compute the slope and intercept of the best-fit line. <table border="1"><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Y</td><td>8</td><td>4</td><td>5</td><td>2</td><td>2</td><td>0</td></tr></table>		X	1	2	3	3	4	5	Y	8	4	5	2	2	0	CO3
X	1	2	3	3	4	5											
Y	8	4	5	2	2	0											

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Q.3	Solve any two questions out of three. (10 marks each)	20														
a)	i) What is a point estimate? State the properties of a point estimator(5M) ii) What is a Hypothesis test? Discuss the Types of Errors in Testing of Hypothesis.(5M)		CO5	U												
b)	In a correlation study, the following values are obtained: <table><tr><td></td><td>X</td><td>Y</td></tr><tr><td>Mean</td><td>65</td><td>67</td></tr><tr><td>S.D.</td><td>2.5</td><td>3.5</td></tr><tr><td colspan="3">Coefficient of correlation (r) = 0.8</td></tr></table> Find the two regression equations that are associated with the above values. What will be the possible value of Y when X is 29?			X	Y	Mean	65	67	S.D.	2.5	3.5	Coefficient of correlation (r) = 0.8			CO3	An
	X		Y													
Mean	65	67														
S.D.	2.5	3.5														
Coefficient of correlation (r) = 0.8																
c)	Draw all possible samples (SRSWOR) of sample size 2 from the population 2,4,6,8,10,12 and verify the following: i) Show that $E(\bar{y}) = \bar{Y}$ (3M) ii) Show that $E(s^2) = S^2$ (3M) iii) Find the variance of estimate of sample mean $\bar{y}$ and show that it agrees with the formula $((n-N)/n \cdot N)S^2$ (2M) iv) Verify that $\text{Var}_{\text{SRSWR}}(\bar{y}) \geq \text{Var}_{\text{SRSWOR}}(\bar{y})$ (2M)	CO2	Ap													
Q.4	Solve any two questions out of three. (10 marks each)	20														
a)	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 $i, j = 1, 2, 3$. $r_{12} = 0.3, r_{23} = 0.4, r_{31} = 0.5$ $\sigma_1 = 3 \quad \sigma_2 = 2 \quad \sigma_3 = 4$ 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												
b)	i) 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		CO6	An												

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	value = 2.262]			
	ii) A company claims that the average life of its LED bulbs is 1200 hours. A random sample of 64 bulbs shows an average life of 1160 hours. The population standard deviation is known to be 160 hours. Test at 5% level of significance whether the company's claim is true [Tabulated value = 1.96]			
c)	Explain several methods for collecting primary and secondary data with suitable examples.		CO1	U
