



SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

REG.NO.:

Programme Name & Branch : B.Tech CSBS
Course Code and Course Name : CBS 1009 Computational Statistics
Faculty Name(s) : Dr. V. Sujatha
Class Number(s) : VL2024250105574
Slot : B2
Date of Examination : 14.10.2024
Exam Duration : 90 minutes

Maximum Marks: 50

General instruction(s) : Answer All Questions

Q. No	Question	M																								
1.	Let the response variables are the sales and profit of a factory and the predictor variables are the absenteeism of workers and the breakdown hours of machine. Construct the multivariate multiple linear regression model from the sample data given below. <table><tr><th>Sales (S)</th><th>Profit (P)</th><th>Absenteeism (A)</th><th>Breakdown hours (B)</th></tr><tr><td>15</td><td>120</td><td>5</td><td>40</td></tr><tr><td>18</td><td>130</td><td>4</td><td>35</td></tr><tr><td>16</td><td>125</td><td>6</td><td>42</td></tr><tr><td>20</td><td>140</td><td>3</td><td>30</td></tr><tr><td>19</td><td>135</td><td>5</td><td>38</td></tr></table>	Sales (S)	Profit (P)	Absenteeism (A)	Breakdown hours (B)	15	120	5	40	18	130	4	35	16	125	6	42	20	140	3	30	19	135	5	38	10
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2.	Given the following weights (in kg) of 20 students 70,75,80,82,85,88,90,93,76,78,84,91,79,83,72,87,89,95,81,86 calculate the autocorrelation for function lagged by 1 and lagged by 2.	10																								
3	The random variables X, Y, and Z have the following variance and covariance matrix: $\begin{pmatrix} 4 & 2 & 1 \\ 2 & 6 & 2 \\ 1 & 2 & 5 \end{pmatrix}$ (a) Find the principal components Y_i, $i=1,2$, and 3.	10																								
4	Nine viewers rated two films on three dimensions: 1. Entertainment value 2. Writing quality 3. Action The ratings are such that a score of 5 means they felt the film was exactly average on that dimension, with higher scores denoting higher quality and lower scores denoting lower quality Using MANOVA, analyse the data and comment.	10																								

	<table><tr><th>viewers</th><th>dimension</th><th>Film 1 rating</th><th>Film 2 rating</th></tr><tr><td>1</td><td>1</td><td>6</td><td>3</td></tr><tr><td>2</td><td>1</td><td>4</td><td>7</td></tr><tr><td>3</td><td>1</td><td>3</td><td>6</td></tr><tr><td>4</td><td>2</td><td>8</td><td>4</td></tr><tr><td>5</td><td>2</td><td>5</td><td>9</td></tr><tr><td>6</td><td>2</td><td>7</td><td>5</td></tr><tr><td>7</td><td>3</td><td>9</td><td>6</td></tr><tr><td>8</td><td>3</td><td>6</td><td>8</td></tr><tr><td>9</td><td>3</td><td>8</td><td>7</td></tr></table>	viewers	dimension	Film 1 rating	Film 2 rating	1	1	6	3	2	1	4	7	3	1	3	6	4	2	8	4	5	2	5	9	6	2	7	5	7	3	9	6	8	3	6	8	9	3	8	7	
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5.	Apply K-means Clustering for the following dataset: (5, 8, 12, 15, 2, 6, 18, 22, 28, 32) Perform K-means clustering with: a) 2 clusters b) 3 clusters	10																																								
