

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

B.Tech-VI Semester (CSE-AI & DS)

COURSE CODE (CREDITS): 25B1WCI643 (3)

MAX MARKS: 35

COURSE NAME: Statistical Analysis and Computing

MAX. TIME: 2 Hours

COURSE INSTRUCTOR: Prof. Pardeep Kumar

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed

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Q.No	Question	CO	Marks																																	
Q1	Suppose we have height, weight and T-shirt size of some customers and we need to predict the T-shirt size of a new customer given only height and weight information we have. Data including height, weight and T-shirt size information is shown below – <table><tr><th>Height (in cms)</th><th>Weight (in kgs)</th><th>T Shirt Size</th></tr><tr><td>158</td><td>58</td><td>M</td></tr><tr><td>158</td><td>59</td><td>M</td></tr><tr><td>158</td><td>63</td><td>M</td></tr><tr><td>160</td><td>59</td><td>M</td></tr><tr><td>160</td><td>60</td><td>M</td></tr><tr><td>163</td><td>60</td><td>M</td></tr><tr><td>163</td><td>61</td><td>M</td></tr><tr><td>160</td><td>64</td><td>L</td></tr><tr><td>163</td><td>64</td><td>L</td></tr><tr><td>165</td><td>61</td><td>L</td></tr></table> New customer named 'Monica' has height 161cm and weight 61kg. Predict the T shirt size of Monica using K- Nearest Neighbor algorithm. Your initialized parameter should be 3.	Height (in cms)	Weight (in kgs)	T Shirt Size	158	58	M	158	59	M	158	63	M	160	59	M	160	60	M	163	60	M	163	61	M	160	64	L	163	64	L	165	61	L	5	8
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165	61	L																																		

Q2	Consider the 2-dimensional dataset given as under: <table><tr><th>Salary (Thousands)</th><th>Age (Years)</th></tr><tr><td>2</td><td>4</td></tr><tr><td>4</td><td>2</td></tr><tr><td>6</td><td>4</td></tr><tr><td>8</td><td>6</td></tr></table> Compute eigen values, eigen vectors and principal components for the above given data. Also convert the resultant attribute into principal component values.	Salary (Thousands)	Age (Years)	2	4	4	2	6	4	8	6	4	7
Salary (Thousands)	Age (Years)												
2	4												
4	2												
6	4												
8	6												
Q3	Consider 8 persons showing interest in personal loan from a reputed public sector bank. Let point(x,y,z) represents their age(in years), salary(in Indian rupees) and income from other sources(in Indian rupees). So the data is represented as Ram (20,35K,10K), Sita (30,25K,5K), Laxman (50,20K,12K), Anil (40,20K,2K), Prem (45,50K,15K), Sunil (21,46K,15K), Sourabh (23,32K,11K) and Meenu (32,27K,13K). The bank manager's task is to check whether the person is rich, medium earning or poor based on the given data. Use k-means clustering algorithm technique based on Euclidean distance to ease manager's task. Show the cluster formation using graphs at each iteration of K-means algorithm.	5	10										
Q4	Consider the multilayer feed forward neural network given as under: The tuple to be processed is (1,0,1) with target output 1. The weight set is {0.2, -0.3, 0.4, 0.1, -0.5, 0.2, -0.3, -0.2} and bias set is {-0.4, 0.2, 0.1} (i) Compute the updated weights and biases for one iteration of backpropagation algorithm for the above artificial neural network. (ii) How many layers ANN the above neural structure is? Show the effect of learning rate selection on the loss function with a graph.	5	8+2										