JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

M.Tech-I Semester (CSE/IT)

COURSE CODE (CREDITS): 22M1WCI131 (3) MAX. MARKS: 35

COURSE NAME: Data Warehousing and Data Mining

COURSE INSTRUCTORS: Dr. Rakesh Kanji MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

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

Q.No	Question	CO	Marks
Q1	Explain the neural network architecture with diagram and real life example. Derive the expression for change in ith layer (δ_i) by considering backpropagation. Derive that neural network becomes linear regression if we don't use non linear activation function.	4,6	3+3+1
Q2	Provide the complete the derivation of SVM. Show pictorially the case where SVM fails and how kernel could help. Provide radial basis function kernel (RBF) expression to find high dimensional projection information.	4,6	3+2+2
Q3	Provide the use of PCA. Derive the principal components. Why we must check the reconstruction for any transformation like PCA and show how reconstruction is possible for PCA. How to guarantee reconstruction if correlation of some data are 100%?	4,6	1+3+(1+1)+1
Q4.	Perform PCA based K mean clustering for below data. Consider Play class for matching clustering result.	4,6	7
Q5	What is clustering and its use? Compare Kmean and Gaussian mixture method for tackling data distributed in irregular fashion. Explain the objective function of GMM.	4,6	2+2.5+2.5

Data id	Outlook	Temperature	Humidity	Play
1	2	2	4	Yes
2	2	4	4	No
3	4	4	6	Yes
4	6	2	6	No
5	8	4	8	Yes
6	10	6	8	No