Time: 1.5 Hours

Max. Marks:30

Q 1	Discuss Deep Learning. How it is different from traditional learning.	3	CO4
Q2	Compare Bagging, Boosting, and Random Forest in terms of bias, variance, and learning approach.	3	CO3
Q3	Differentiate between linear and non-linear data. In which case kernel is required? Explain different types of kernels.	3	CO4
Q4	Discuss Statistical Learning Theory and applications.	3	CO4
Q5	Given the following dataset and **k = 2**, perform clustering by the k-means clustering algorithm. **Dataset (2D Points)** P1=(2,3), P2=(5,4), P3=(3,6), P4=(8,7), P5=(6,2) centroids: **C1** = (2,3),**C2** = (6,2)	8	CO4
Q6	What is matrix factorization and matrix completion? Discuss the situations where matrix completion is required.	2	CO3
Q7	Explain the PCA (Principal Component Analysis) algorithm. Suppose the data consists of 2-dimensional points: {(-3,-3), (-1,-1),(1,1),(3,3)} Perform PCA manually to reduce the data from 2D to 1D and compute the principal component.	8	CO4