



N.B : (1) Question No. 1 is Compulsory.

(2) Attempt any **Three** questions out of the remaining **Five** questions.

(3) Figures to the right indicate full marks.

(4) Assume any suitable data wherever required, but justify the same.

- 1) (a) What are the issues in Machine Learning? (05)
- (b) Explain Regression line, Scatter plot, Error in prediction and Best fitting line. (05)
- (c) Describe the essential steps of K-means algorithm for clustering analysis. (05)
- (d) What is SVM? Explain the following terms: hyperplane, separating hyperplane, margin and support vectors with suitable example. (05)
- 2) (a) Explain in detail Temporal Difference Learning. (08)
- (b) Create a decision tree for the attribute "class" using the respective values: (12)

eyecolour	married	sex	hairlength	class
brown	yes	male	long	football
blue	yes	male	short	football
brown	yes	male	long	football
brown	no	female	long	netball
brown	no	female	long	netball
blue	no	male	long	football
brown	no	female	long	netball
brown	no	male	short	football
brown	yes	female	short	netball
brown	no	female	long	netball
blue	no	male	long	football
blue	no	male	short	football

- 3) (a) What are the different Hidden Markov Models? (10)
- (b) What is Reinforcement Learning? Explain with the help of an example. (10)
- 4) (a) Apply K-means algorithm on given data for $k=3$. Use $C_1(2)$, $C_2(16)$ and $C_3(38)$ as initial cluster centres.
Data: 2, 4, 6, 3, 31, 13, 15, 16, 38, 35, 14, 21, 23, 25, 30
- (b) Explain with suitable example the advantages of Bayesian approach over classical approaches to probability. (10)
- 5) (a) Explain in detail Principal Component Analysis for Dimension Reduction. (10)
- (b) Find optimal hyperplane for the data points: (10)
 $\{(1,1), (2,1), (1,-1), (2,-1), (4,0), (5,1), (5,-1), (6,0)\}$
- 6) Write Short Notes on the following: (Any two) (20)
- a. Machine Learning applications
 - b. Classification using Back Propagation Algorithm
 - c. Issues in Decision Tree