Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q1 Attempt any **four** from following. [20]

A How to choose the right ML algorithm?

B Explain Regression line, Scatter plot, Error in prediction and Best fitting line.

C Explain the concept of feature selection and extraction.

D Explain K-means algorithm.

E Explain the concept of Logistic Regression

Q2 A Explain any five applications of Machine Learning. [10]

B Explain Multivariate Linear regression method. [10]

Q3 A Create a decision tree using Gini Index to classify following dataset for profit. [10]

Age	Competition	Type	Profit
old	Yes	software	down
old	No	software	Down
old	No	hardware	Down
mid	Yes	software	Down
mid	Yes	hardware	Down
mid	No	hardware	Up
mid	No	software	Up
new	Yes	software	Up
new	No	hardware	Up
new	no	software	Up

B Find SVD for $A = \begin{bmatrix} 2 & 2 \\ -1 & 1 \end{bmatrix}$ [10]

Q4 A Explain the Random Forest algorithm in detail. [10]

B Explain the concept of bagging and boosting. [10]

Q5 A Describe Multiclass classification. [10]

B Explain the concept of Expectation Maximization Algorithm. [10]

Q6 Write detailed note on following. (**Any two**) [20]

A Linear Regression

B Linear Discriminant Analysis for Dimension Reduction

C DBSCAN