Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

VI SEMESTER B.TECH. (COMPUTER SCIENCE & ENGG)

MAKEUP EXAMINATIONS, JUNE 2019

SUBJECT: MACHINE LEARNING [CSE 4010]

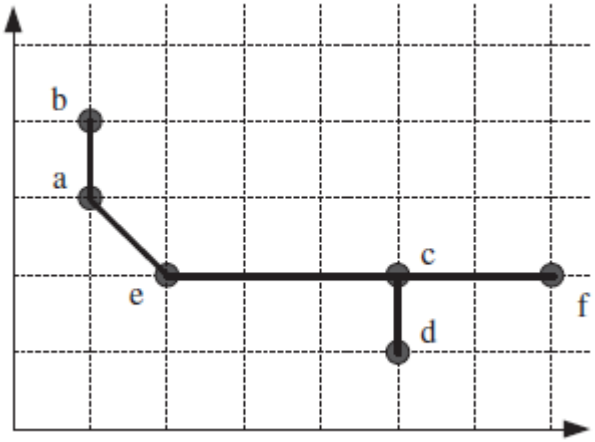
REVISED CREDIT SYSTEM
(18/06/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A.	Explain the terms ill-posed problem, inductive bias, model selection, generalization.	**4**
1B.	What is meant by an association rule? Explain. Also explain the three measures that are frequently calculated in learning association rules.	**4**
1C.	List and explain any two applications of machine learning.	**2**
2A.	Explain maximum a posteriori estimate and Bayes' estimator. Under which assumption do these estimates give correct values?	**4**
2B.	What is meant by imputation? Explain the different types of imputation.	**3**
2C.	Imagine our hypothesis is not one rectangle but a union of two (or m > 1) rectangles. What is the advantage of such a hypothesis class? Show that any class can be represented by such a hypothesis class with large enough m.	**3**
3A.	Show the perceptron that calculates the odd parity of its three inputs.	**5**
3B.	Write the online k-means algorithm and explain. Also explain any two methods to avoid centres that are there but not effectively utilised.	**3**
3C.	In a two-class problem, the log odds is defined as log ($P(C_1\|x)$ / $P(C_2\|x)$). Write the discriminant function in terms of the log odds.	**2**
4A.	Explain gradient descent. Also explain where it is used.	**3**
4B	What do you mean by linearly separable? With an example, explain the working principle of support vector machines.	**3**

4C	Explain the different types of hierarchical clustering. For the two dimensional dataset shown in figure 4C, use any clustering method & draw the resulting dendrogram.  Figure 4C	**4**
5A.	How is the goodness of a split measured in a decision tree for regression? Explain & write the expression for this. Derive the expression for the error after the split.	**5**
5B.	What is meant by a first-order Markov model? Draw a markov model with three states and explain.	**3**
5C.	Explain graphical model with an example.	**2**