Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent institution of MAHE, Manipal)

VI SEMESTER B.TECH. (MECHATRONICS ENGINEERING)

MAKE-UP EXAMINATIONS, MAY 2018

SUBJECT: MACHINE LEARNING [MTE 4025]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** questions.
- Data not provided may be suitably assumed

1A. Two models with the following AIC and Akaike weights are given. Which of the two models is the best fit to the data? Justify. **3**

Model	AIC	Akaike weight
Model A	0.001	90
Model B	0.5	78.9

1B. Elaborate on how the cost function of Logistic regression is estimated. Why is it different from Linear regression? **7**

2A. Apply the Apriori algorithm to the following item set for a minimum support count of 2. **5**

TID	List of Items
T100	I1, I2, I5
T100	I2, I4
T100	I2, I3
T100	I1, I2, I4
T100	I1, I3
T100	I2, I3
T100	I1, I3
T100	I1, I2 ,I3, I5
T100	I1, I2, I3

2B. How is Principal Component Analysis different from Linear Regression? Explain using a suitable graph. **3**

2C. What is Bagging? Describe the process of Bagging using a suitable diagram. **2**

3A. Differentiate between Bayesian Decision theory and Naïve Bayes algorithm. Illustrate the Bayesian Decision theory using a flowchart. **4**

3B. Describe the process of obtaining a Contour plot for the cost function estimation in Linear Regression. Is the same plot obtained in case of Logistic Regression as well? Justify. **6**

4A. Cluster the following dataset into two clusters using K-means algorithm. **4**

Height	Weight
185	72
170	56
168	60
179	68
182	72
188	77
180	71
180	70
183	84
180	88
180	67
177	76

4B. How is Euclidean distance different from Manhattan distance? Describe using example data. **3**

4C. How does the Support Vector Machine algorithm find the best possible way to split data into two clusters? Illustrate using an example. **3**

5A. Design a neural net to predict the outputs of the following gates: **4**

a) XOR
b) XNOR
c) NAND
d) NOR

5B. Given below is a dataset for properties of fruits. Totally there are 1000 fruits of which the types are Banana, Orange and Others. Use Naïve Bayes predictor to predict that if a Long, Sweet and Yellow fruit is introduced, as the 1001'th fruit, then it is a Banana indeed. **6**

Fruit	Long	Sweet	Yellow	Total
Banana	400	350	450	500
Orange	0	150	300	300
Other	100	150	50	200
Total	**500**	**650**	**800**	**1000**