Seat No:

MIT ACADEMY OF ENGINEERING

COURSE CODE: CS332T **2 APRIL 2019**

TY BTECH SEMESTER - VI 2018 - 2019 EXAMINATION

DEPARTMENT OF COMPUTER ENGINEERING

IN COURSE EXAMINATION

MACHINE LEARNING (OPEN ELECTIVE - MACHINE INTELLIGENCE)

TIME : 2 HOURS **MARKS : 50 MARKS**

TOTAL NO OF QUESTIONS: 4 **TOTAL NO OF PRINTED PAGES: 3**

INSTRUCTIONS TO CANDIDATES:

1. Assume suitable data wherever necessary
2. Non programmable scientific calculators are allowed
3. Black figures to the right indicate full marks

1	**a)**	Explain Training dataset, Test dataset and supervise Learning (Train data-1 + Test data-1 + Supervise Learning-2)	**[4]**	**CO1**	**L2**
	b)	Explore the all process of the machine learning cycle with example (proces-3 mks + explanation with example-3 mks)	**[6]**	**CO2**	**L3**
2	**a)**	Why is naive Bayesian classification called “naive”? Briefly outline the major ideas of naive Bayesian classification. (3+3)	**[6]**	**CO2**	**L3**
	b)	Assume that the probability that a born baby is a boy is 0.5, and that gender is independent between births. A family has four children. Compute i) The probability that they have two boys and two girls, conditional that the first (oldest) is a boy ii) The probability that they have two boys and two girls, conditional that at least one is a boy. (i-2 Mks + ii-2 Mks)	**[4]**	**CO3**	**L3**

3	**a)**	Explain with Suitable example the advantages of Bayesian approach over classical approach to probability? (Adv. Bayesian over Classical – 3 Mks, Example 3 Mks)	**[6]**	**CO3**	**L3**
	b)	As of September 2018, 800 extrasolar planets have been identified in our galaxy. Super-secret surveying spaceships sent to all these planets have established whether they are habitable for humans or not, but sending a spaceship to each planet is expensive. In this problem, you will come up with decision trees to predict if a planet is habitable based only on features observable using telescopes. Derive and draw the decision tree learned by ID3. Make sure to clearly mark at each node what attribute you are splitting on, and which value corresponds to which branch. By each leaf node of the tree, write in the number of habitable and inhabitable planets in the training data that belong to that node. (Explanation-2, Derivation -5, tree construction -3)	**[10]**	**CO4**	**L4**

Size	Orbit	Habitable	Count
Big	Near	Yes	20
Big	Far	Yes	170
Small	Near	Yes	139
Small	Far	Yes	45
Big	Near	No	130
Big	Far	No	30
Small	Near	No	11
Small	Far	No	255

4 a) Consider the following set of training examples. **[10] CO4 L5**

	Status	Floor	Dept.	Office Size	Recycling Bin
1	faculty	four	CS	medium	yes
2	student	four	EE	large	yes
3	staff	five	CS	medium	no
4	student	three	EE	small	yes
5	staff	four	CS	medium	no

Assume that each of the attributes assumes just the values that appear on the table

a) Construct a Bayesian network that represents all attributes in the above example, assuming that the predicting attributes are pairwise independent. Provide the probability table for each of the predicting attributes.

b) Show how a naive Bayesian classifier would classify the following instance: (a-(4+3) mks, b-3 mks)

Status	Floor	Dept.	Office Size	Recycling Bin
student	four	CS	small	??

b) State and Explain the Maximum likelihood estimation and Bayes Estimator. **[4] CO3 L2**

(MLE-2 mks, BE-2 mks)

[3]