

Total No. of Questions : 8]

SEAT No. :

**P7660**

[Total No. of Pages : 3

[6180]-184

**T.E. (Mechanical)**

**ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

**(2019 Pattern) (Semester - II) (302049)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Assume suitable data if necessary.
- 4) Use of Non-Programmable Scientific Calculator is allowed.

**Q1) a)** Use ID3 algorithm to construct a decision tree for the data in the following table: **[6]**

Instance No.	X1	X2	Class label
1	T	T	1
2	T	T	1
3	T	F	0
4	F	F	1
5	F	T	0
6	F	T	0

- b) How does the K Nearest Neighbour (KNN) algorithm works? **[7]**
- c) Explain bagging and boosting. **[4]**

OR

**Q2) a)** Use Naïve Bayes algorithm to determine whether a Red SUV Domestic car is a stolen car or not using the following data: **[6]**

Example No.	Colour Type.	Origin	Whether stolen
1	Red Sports	Domestic	Yes
2	Red Sports	Domestic	No
3	Red Sports	Domestic	Yes
4	Yellow Sports	Domestic	No
5	Yellow Sports	Imported	Yes
6	Yellow SUV	Improted	No

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7	Yellow SUV	Imported	Yes
8	Yellow SUV	Domestic	No
9	Red SUV	Imported	No
10	Red Sports	Imported	Yes

- b) Explain working of Support Vector Machines? What are hyper parameters in SVM? [7]
- c) How Naïve Bayes is used for classification. [4]

**Q3) a)** What is hyper parameter tuning? Explain any two hyper parameters in the Random Forest algorithm. [9]

b) What is a confusion matrix? Write any  $2 \times 2$  confusion matrix showing, True Positive, True Negative, False Positive, False negative. [9]

Define

- i) Accuracy
- ii) Precision
- iii) Recall

OR

**Q4) a)** Why is data preprocessing required? Explain techniques of preprocessing data. [9]

b) Explain following performance evaluators used for interpretation/assessment of classification model: [9]

- i) Cohen's Kappa Coefficient
- ii) F Score
- iii) ROC Curve

**Q5) a)** Define Markov property. Explain why Markov property is applicable in solving Reinforcement learning. [9]

b) The transfer function of neurons on one layer of a neural network is assumed to be of sigmoid form. Evaluate the output of neurons corresponding to input  $x = 0.62$ . How is the nature of sigmoid function? (Justify the answer with plot) [9]

OR

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**Q6) a)** What are the characteristics of deep learning? What is the difference between deep learning and machine learning? [9]

b) Explain the working of biological neurons? Explain with a neat diagram equivalence of biological neuron and artificial neuron. [9]

**Q7) a)** Explain any one mechanical engineering application where image-based classification can be adopted. [8]

b) What is predictive maintenance? Explain different steps in predictive maintenance. [9]

OR

**Q8) a)** Explain human and machine interaction? [8]

b) Write a short note on use of AIML in traffic control. [9]

