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SEAT No. :

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T.E. (Mechanical)

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

(2019 Pattern) (Semester - VI) (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, 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) Is Naïve Bayes supervised or unsupervised algorithm? Explain Naïve Bayes algorithm for suitable multiple feature classification example? **[7]**

b) Use 1D3 algorithm to construct a decision tree for the data in the following table. **[10]**

Instance No.	X_1	X_2	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

OR

Q2) a) Define following terms of Decision tree with neat sketch. **[6]**

i) Root Node

ii) Leaf Node

iii) Branch/Sub Tree

iv) Pruning

b) How does the random forest tree algorithm work for classification? **[5]**

c) Differentiate between logistic regression and linear regression? **[6]**

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Q3) a) Enlist and explain steps involved in development of classification model. **[6]**

b) What is hyper parameter tuning? Enlist different hyper parameter tuning algorithms. Explain any two hyper parameters in Random Forest algorithm. **[6]**

c) What is confusion matrix? Write any 2 × 2 confusion matrix showing, True Positive, True Negative, False Positive, False negative? Define **[6]**

i) Accuracy

ii) Precision

iii) Recall

OR

Q4) a) Why data pre-processing is required? Explain techniques of pre-processing data. **[6]**

b) Explain **[6]**

i) Overfitting

ii) Under fitting

iii) Exact Fit Model with suitable sketch

c) Explain following performance evaluators used for interpretation/ assessment of classification model. **[6]**

i) Cohen's Kappa Coefficient

ii) F Score

iii) ROC Curve

Q5) a) Explain how reinforcement learning is different from other machine learning paradigms? Explain Reinforcement learning with a neat sketch. **[6]**

b) What do you understand from On policy and Off policy algorithm in reinforcement learning? Explain Q- learning algorithm with flow diagram. **[6]**

c) The transfer function of neuron on one layer of a neural network is assumed to be of sigmoid form. Evaluate the output of neuron corresponding to input x = 0.62. How is the nature of sigmoid function? (Justify the answer with plot) **[6]**

OR

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Q6) a) Define following terms for Reinforcement learning. **[6]**

i) Agent

ii) Environment

iii) Reward

iv) State

b) Explain Bellman Equation in Reinforcement Learning. How Bellman equation significant in maximization of rewards in Reinforcement learning. **[6]**

c) Explain working of Convolutional Neural Network (CNN) with flow diagram. **[6]**

Define

i) Padding

ii) Striding in CNN

Q7) a) Explain human and machine interaction? Explain with any example. **[5]**

b) Explain the steps involved in material inspection? How machine learning can be implemented in material inspection. **[6]**

c) Explain the use of Machine learning in process Optimization. **[6]**

OR

Q8) a) What is predictive maintenance? Explain different steps in predictive maintenance. **[6]**

b) Explain any one mechanical engineering application where image-based classification can be adopted. **[5]**

c) Explain different steps in Dynamic system reduction. **[6]**

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