Total No. of Questions : 8]

SEAT No. :

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T.E. (Mechanical)
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING
(2019 Pattern) (Semester - II) (302049)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
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 Naive Bayes supervised or unsupervised algorithm? Why? **[2]**

b) Differentiate between clustering and classification. **[6]**

c) Explain how Support Vector Machine works ? Explain with neat sketch Hard Margin and Soft Margin. **[9]**

OR

Q2) a) Define following terms of Decision tree. **[2]**

i) Leaf node

ii) Pruning

b) How does K-means work? **[6]**

c) Use Naive Bayes algorithm to determine whether a red domestic SUV car is a stolen car or not using the following data : **[9]**

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	imported	no
7	yellow	SUV	imported	yes
8	yellow	SUV	domestic	no
9	red	SUV	imported	no
10	red	sports	imported	yes

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Q3) a) What are four typical problems to be solved using machine learning approach? **[6]**

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

c) Explain use of Confusion matrix in Machine Learning Model with suitable example. **[6]**

OR

Q4) a) What is hyper parameter tuning? Explain any three hyper parameters tuned in SVM? **[6]**

b) What is training data, labeled data and unlabeled data? What are key steps involved in developing training data? **[6]**

c) Explain with neat sketch K-fold cross-validation mode. **[6]**

Q5) a) Explain the concept of Reinforcement learning with an example. Also define key terms used in Reinforcement learning. **[8]**

b) 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). **[4]**

OR

Q6) a) Explain Convolution Neural Network (CNN) using neat flow diagram. Explain padding and striding in CNN. **[8]**

b) Explain SARSA algorithm for reinforcement learning. **[6]**

c) A neuron with 4 inputs has the weights 1,2,3,4 and bias 0. The activation function is linear, say the function f(x) = 2x. If the inputs are 4, 8,5,6 compute the output. Draw a diagram representing the neuron. **[4]**

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

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

c) Explain with suitable example how fault detection is done. **[6]**

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OR

Q8) a) Explain different steps in Dynamic system reduction. **[5]**

b) Explain any one mechanical engineering application where image-based classification can be adopted. **[6]**

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

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