Total No. of Questions : 8]

SEAT No. :

PA-1501

[Total No. of Pages : 4

[5926]-121

T.E. (IT)

MACHINE LEARNING

(2019 Pattern) (Semester - I) (314443)

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) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) What do you mean by coefficient of regression? Explain SSE, MSE and MAE in context of regression. **[CO2, L3]** **[5]**

b) What is multiple regression? How it is different from simple linear regression **[CO2, L1]** **[5]**

c) Consider the following data

The values of *x* and their corresponding values of *y* are shown in the table below

i) Find values of β0 and β1 w.r.t. linear regression model which best fits given data.

ii) Interpret and explain equation of regression line.

iii) Estimate the value of *y* for *x* = 90.

	x	y
1	95	85
2	85	95
3	80	70
4	70	65
5	60	70

[7]

[CO2, L3]

OR

P.T.O.

Q2) a) Explain under fit, over fit and just fit models for Regression **[CO2, L1]** **[5]**

b) Explain bias-variance dilemma **[CO2, L2]** **[5]**

c) What is univariate and multivariate regression? Explain any three measures of Evaluation of performance of regression model. **[CO2, L2]** **[7]**

Q3) a) For the given data set apply Naïve Bayes Classifier and predict the Class for weather = Sunny and car = working. **[10]**

Weather	Car	Class
Sunny	Working	Go-out
Rainy	Broken	Go-out
Sunny	Working	Go-out
Sunny	Working	Go-out
Sunny	Working	Go-out
Rainy	Broken	Stay-home
Rainy	Broken	Stay-home
Sunny	Working	Stay-home
Sunny	Broken	Stay-home
Rainy	Broken	Stay-home

[CO4, L3]

b) What is decision tree? Explain ID-3 algorithm of Decision tree in detail. **[CO4, L2]** **[8]**

OR

Q4) a) For the following data calculate weighted average entropy for all features.
Length = [3,4,5] [2+, 0–] [1+, 3–] [2+, 2–]
Gills = [Yes, No] [0+, 4–] [5+, 1–]
Beak = [Yes, No] [5+, 3–] [0 +, 2–]
Teeth = [many, few] [3+, 4–] [2+, 1–]
[CO4, L3] **[10]**

b) Define and Explain following terms **[8]**

i) Bayesian Network

ii) Advantages and disadvantages of Naïve Bayes Classifier

[CO4, L2]

Q5) a) Find all association rules using apriori algorithm in the following database in the following database with minimum support = 2 and minimum confidence = 65%. **[10]**

Transactions	Data Items
T1	Pen, Pencil, Notebook
T2	Pencil, File
T3	Pen, Pencil, Notebook, File
T4	Pen, Notebook
T5	Pencil, Scale, File
T6	Pencil, Scale
T7	Pen, Pencil, Scale

[CO5, L3]

b) What is use of K-means algorithm? Explain Centroid and medoid? Explain different types of distances measures. **[CO5, L2]** **[8]**

OR

Q6) a) Explain following Terms **[8]**

i) Rule

ii) Support

iii) Lift

iv) Confidence

[CO5, L2]

b) Apply KNN on the following data and classify the new sample (3,7) to the respective class. **[10]**

X	Y	Class
7	7	Pass
7	4	Pass
3	4	Fail
1	4	Fail
4	3	Fail
6	7	Pass
3	7	?

What will be the effect on output if k = 3 and k = 5?

[CO5, L3]

Q7) a) With the help of suitable diagram explain Biological Neuron.**[CO6, L3]** **[6]**

b) What is the use of activation function in Neural Network? Explain any two activation functions in detail **[CO6, L2]** **[6]**

c) What is deep learning? Explain different applications of deep learning. **[CO6, L1]** **[5]**

OR

Q8) a) What is perceptron? Explain multilayer perceptron in detail. **[CO6, L3]** **[6]**

b) Write a note on following activation functions. **[6]**

i) Sigmoid

ii) Tanh

iii) ReLU **[CO6, L2]**

c) What is ANN? Explain McCulloch Pitts Neuron **[CO6, L2]** **[5]**

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