SEAT No. :

PA-1501

[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 $\beta0$ and $\beta1$ 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 $x = 90$. **[7]**

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

[CO2, L3]

OR

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]**

<div align="center">OR</div>

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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