Total No. of Questions : 8]

SEAT No. : ____

PC1803

[Total No. of Pages : 4

[6353]-122
T.E. (IT)
MACHINE LEARNING
(2019 Pattern) (Semester - I) (314443)

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

Q1) a) What is linear Regression? When is it suitable to use linear regression over classification? **[6]**

b) What is bias-variance? Give its impact in choosing the best model. **[5]**

c) Explain evaluation metrics or loss functions for regression. **[6]**

OR

Q2) a) Explain gradient descent with respective to linear regression. **[6]**

b) Explain under fit,over fit and just fit models for Regression. **[5]**

c) What is regression? Explain univariate regression and multivariate regression. **[6]**

Q3) a) What is decision tree? Explain ID-3 algorithm of Decision tree in detail. **[8]**

b) Define **[4]**

i) Conditional Probability

ii) Posterior Probability

c) Explain in brief the Bayesian network for learning and inference. **[6]**

OR

P.T.O.

Q4) a) For given dataset predict the class of new test instance using naïve Bayes classifier. Given a new instance as:

(Outlook = Sunny; Temperature =Cool; Humidity= High; Wind= Strong)

What will be the value of PlayTennis? **[12]**

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rain	Mild	High	Strong	No

b) Explain the measures of impurity (Information Gain, Gini Index, and Entropy). **[6]**

Q5) a) Using k-means algorithm cluster the following eight data points (with (x, y) representing locations) into three clusters (C1= (2,5), C2=(5,8), C3=(1,2)) **[12]**

X:	2	2	8	5	7	6	1	4
Y:	10	5	4	8	5	4	2	9

b) Explain the following terms: **[6]**

i) Support

ii) Confidence

iii) Lift

OR

Q6) a) Consider the following sample dataset of students. Using K-Nearest-Neighbour classifier predicts the result of new student S_{new} (new test instance). (use k=3 and Euclidean Distance measure) **[10]**

Student	Rating by Internal Examiner (X_{i1})	Rating by External Examiner (X_{i2})	Result (Y)
S1	7	7	PASS
S2	7	4	PASS
S3	3	4	FAIL
S4	1	4	FAIL
S_{new}	3	7	??

b) Explain Hierarchical clustering with suitable example. **[8]**

Q7) a) With the help of suitable diagram explain architecture of Artificial Neural Network. **[6]**

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

c) Explain deep learning with applications. **[5]**

OR

Q8) a) Explain Perceptron training algorithm used for linear classification. **[6]**

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

i) Sigmoid

ii) Tanh

iii) ReLU

c) How artificial neuron is inspired by biological neuron. **[5]**

* * *