Total No. of Questions : 10]

SEAT No. :

P2350

[Total No. of Pages : 3

[5254]-683
B.E. (Information Technology)
MACHINE LEARNING
(2012 Pattern) (End Semester)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Use of calculator is allowed.***
4) ***Assume Suitable data if necessary***

Q1) a) For following multi-class classification predictions: **[6]**

	Predicted		
	15	2	3
Actual	7	15	8
	2	3	45

Calculate Accuracy, Per Class Precision, Per Class Recall.

b) Define and explain regression with its model. **[4]**

OR

Q2) a) Derive and explain output code matrix for One Vs One and One Vs Rest Scheme for construction of Multi class classifier (for 3 classes) **[6]**

b) How the performance of a regression function is measured? **[4]**

Q3) a) What are the different types of regularizers? **[6]**

b) What is a Probabilistic Model? Give an example of it. **[4]**

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OR

Q4) a) What are grouping models and grading models? Give one example of each. **[4]**

b) Consider the following data points: **[6]**

X	Y
1	1.5
2	2.75
3	4
4	4.5
5	5.5

Calculate the Cost Function for $\theta_0 = 0.5$ and $\theta_1 = 1$ using linear regression.

Q5) a) In a given dataset of 14 samples, 9 are positive and 5 are negative. Calculate the entropy of the dataset. **[6]**

b) Find all association rules in the following database with minimum Support =2, minimum confidence=70%. **[12]**

TID	Items
1	{a,b,c}
2	{b,c,d,e}
3	{c,d}
4	{a,b,d}
5	{a,b,c}

OR

Q6) a) Consider following dataset: **[10]**

X_1	X_2	Y
2	1	4
6	3	2
2	5	2
6	7	3
10	7	3
4	4	2
7	6	3

Model this function using the K-nearest neighbor regression. What will be the value of Y for the instance $(X_1,X_2)=(4,5)$ and K = 3

b) How empirical probabilities can be used in ranking and probability estimation. trees? Explain the purpose of pruning the subtree of a decision tree. **[8]**

Q7) a) Explain one dimensional and N- Dimensional Gaussian Mixture Model. **[8]**

b) What is logistic regression? How it outperforms basic linear classifier? **[8]**

OR

Q8) a) Write a note on Multi-nominal Distribution. **[8]**

b) Define and describe Logistic Regression. **[8]**

Q9) a) Explain Random Forest Method. **[8]**

b) What is the motivation behind Reinforcement Learning. Explain it with help of digram stating its important entities. **[8]**

OR

Q10)a) Write a note on Deep Learning and its applications. **[7]**

b) Define and explain: **[9]**

i) Sequence Prediction

ii) Sequence Generation

iii) Sequence Classification