

Total No. of Questions : 10]

SEAT No. :

P3446

[Total No. of Pages : 3

[5670] 722

B.E. (IT)

MACHINE LEARNING & APPLICATIONS

(2015 Pattern) (414454) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Figures to the right indicate full marks.
- 2) Draw neat, well labeled sketch wherever necessary.

Q1) a) What is Machine Learning? Explain types of machine learning. [5]

b) Explain any two approaches to construct multiclass classifier. [5]

OR

Q2) a) Consider following confusion matrix and calculate following : [5]

i) Sensitivity of classifier.

ii) Specificity of classifier.

Confusion Matrix		Predicted		Total
		+	-	
Actual	+	8	10	18
	-	4	8	12
Total		12	18	30

b) What do you mean by least square method? Explain least square method in the context of linear regression. [5]

Q3) a) Explain any one kernel method to handle non linearly separable data. [5]

b) Explain Ridge and Lasso regression. [5]

OR

Q4) a) Describe Principal Component Analysis. [5]

b) What do you mean by coefficient of regression? Explain SST, SSE, SSR, MSE in the context of regression. [5]

P.T.O.

- Q5)** a) Let on a scale of 1 to 10 (where 1 is lowest and 10 is highest), a student is evaluated by internal examiner and external examiner and accordingly student result can be pass or fail. A sample data is collected for 4 students. If a new student is rated by internal and external examiner as 3 and 7 respectively (test instance), decide new student's result using KNN classifier. [9]

Student No.	(Xi1) Rating by internal examiner	(Xi2) Rating by external examiner	(Y) Result
S1	7	7	Pass
S2	7	4	Pass
S3	3	4	Fail
S4	1	4	Fail
Snew	3	7	?

- b) What do you mean by distance metric and exemplar? Explain different types of distances, measures. [9]

OR

- Q6)** a) Consider following instances given as input to K-Means clustering algorithm for  $k = 3$ . Find members of these 3 clusters after 2 iterations.  
 $X = \{(2, 10), (2, 5), (8, 4), (5, 8), (7, 5), (6, 4), (1, 2), (4, 9)\}$  [9]
- b) Explain association rule mining. Comment on role of support and confidence in association rule mining. [9]

- Q7)** a) Explain discriminative learning with maximum likelihood. [8]
- b) Explain Naïve Baye's classifier in detail. [8]

OR

- Q8)** a) At a certain university, 4% men are over 6 feet tall and 1% women are over 6 feet tall. The total student population is divided in the ratio 3 : 2 in favor of women. If a student is selected at random from among all those over six feet tall, what is the probability that the student is a woman? [8]
- b) Define and explain : [8]
- Univariate normal Distribution.
  - Multivariate normal distribution.

- Q9)** a) Explain bagging and boosting as ensemble method. [8]  
b) Explain Reinforcement learning with the help of diagram stating its important entities. [8]

OR

- Q10)** a) Write short note on : [8]  
i) Sigmoid.  
ii) Tanh.  
iii) ReLU.  
b) Describe Feed Forward Neural Network in detail. [8]

