Exam.Code:0924
Sub. Code: 6522

2053

B.E. (Information Technology)
Sixth Semester
PCIT-602: Machine Learning

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Answer the following:-

(a) What is the overfitting? How to reduce the overfitting?

(b) Write formula for MSE and RSS?

(c) What is the role of boundary in a classifier?

(d) What will be the equation of boundary in a classifier for two features with 0.7 threshold?

(e) What is the use of reducing dimensions in the data? (5x2)

UNIT - I

II. (a) What is gradient descent algorithm? Write formula to update weights using gradient descent algorithm? Explain importance of gradient of error and learning rate with the help of an example.

(b) What is the importance of regularization? What will be effect on value of 'θ' for, $\lambda=0$ and $\lambda = \infty$? (2x5)

III. Perform classification on following data using classification error method of decision tree algorithm

X1	T	T	T	T	T	F	F	F	T
X2	F	T	T	F	T	F	F	F	F
Y (Actual output)	Yes	Yes	Yes	Yes	No	Yes	No	No	No

(10)

IV. Design XNOR gate using neural network. Choose appropriate weights and finally draw the network. (10)

P.T.O.

UNIT - II

V. Make clusters using single link cluster method for the distance matrix below:-

	P1	P2	P3	P4	P5
P1	0				
P2	9	0			
P3	3	7	0		
P4	6	5	9	0	
P5	11	10	2	8	0

(10)

VI. (a) Derive the equations of mean and variance from logliklihood equation

(b) Derive the value of logliklihood for multivariate Gaussian. (2x5)

VII. Find out principal components for the following data

$$X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} \quad \textit{and} \quad Y = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix}$$

(10)

x-x-x