Seat No:					Q.P. Code:	CW130

D.K.T.E. Society's
TEXTILE AND ENGINEERING INSTITUTE, ICHALKARANJI.
(An Autonomous Institute)

Exam –	Semester End Examination
Class –	Third Year B.Tech.
Program –	Computer Science and Engineering
Course Code –	CSL303
Course Title –	Machine Learning

Session –	Winter 2018
Day –	Thursday
Date –	22/11/2018
Time –	10:00 - 1:00 PM
Max.Marks –	100

Instructions:

1. ***All Questions are compulsory***
2. ***Assume suitable data if necessary and mention it clearly***
3. ***Use of only Non-Programmable calculator is allowed***

Q. No.	Question	Marks	Bloom's Taxonomy Level	CO No
Q.1	Attempt any four questions a) What is recommender system? Why is it needed? List applications of recommender system. b) Explain supervised and unsupervised classification techniques. c) Explain parameter estimation for multiple linear regression using gradient descent technique. d) Explain Regularization in linear regression. e) Explain Structure of a biological neuron.	20	Understand	1
Q.2	Attempt any two questions: a) For following confusion matrix of an animal classifier, determine accuracy, precision and recall parameters.	16	Analyze	2

		Actual Class	
		Cat	Non cat
Predicted class	Cat	10	3
	Non Cat	4	11

Comment on the classification performance of this classifier

b) Calculate correlation coefficient for following data.

X	Y
5	21
10	30
15	38
20	89
25	125

Is this data suitable for linear regression?

c) Discuss effect of regression parameters on the probability of output class in logistic regression.

<table>
<tr><td>Q.3</td><td>Attempt any four questions
a) Explain Content based recommender system.
b) How cluster quality is measured in K-mean clustering?
c) Explain merits and demerits of decision tree classifier.
d) Explain Bayesian Classifier.
e) Derive equation for parameter estimation in multilayer neural network using back propagation technique.</td><td>20</td><td>Understand</td><td>1</td></tr>
<tr><td>Q.4</td><td>a) Design an artificial neuron for XOR operation.
b) Determine class of iris flower having following attributes using K-nn classifier with K =3
<table><tr><td>sepal length</td><td>sepal width</td><td>petal length</td><td>petal width</td></tr><tr><td>5.5</td><td>2.3</td><td>4</td><td>1.3</td></tr></table><table><tr><td colspan="5">Training Dataset</td></tr><tr><td>sepal length</td><td>sepal width</td><td>petal length</td><td>petal width</td><td>class</td></tr><tr><td>5.1</td><td>3.5</td><td>1.4</td><td>0.2</td><td>Iris-setosa</td></tr><tr><td>4.9</td><td>3</td><td>1.4</td><td>0.2</td><td>Iris-setosa</td></tr><tr><td>4.7</td><td>3.2</td><td>1.3</td><td>0.2</td><td>Iris-setosa</td></tr><tr><td>7</td><td>3.2</td><td>4.7</td><td>1.4</td><td>Iris-versicolor</td></tr><tr><td>6.4</td><td>3.2</td><td>4.5</td><td>1.5</td><td>Iris-versicolor</td></tr><tr><td>6.9</td><td>3.1</td><td>4.9</td><td>1.5</td><td>Iris-versicolor</td></tr></table></td><td>16</td><td>Apply</td><td>3</td></tr>
<tr><td>Q.5</td><td>Attempt any two questions:
a) Identify two clusters in following data using Agglomerative Hierarchical clustering technique
<table><tr><td>Object</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr><tr><td>X1</td><td>25</td><td>44</td><td>19</td><td>55</td><td>15</td></tr></table>b) Find the root node of the Decision Tree to classify fitness using following Data
<table><tr><td>Age</td><td>Eat fastfood</td><td>Do Exercise</td><td>Fitness</td></tr><tr><td>< 30</td><td>yes</td><td>No</td><td>Unfit</td></tr><tr><td>< 30</td><td>No</td><td>No</td><td>fit</td></tr><tr><td>< 30</td><td>No</td><td>Yes</td><td>fit</td></tr><tr><td>> 30</td><td>yes</td><td>No</td><td>Unfit</td></tr><tr><td>> 30</td><td>No</td><td>No</td><td>fit</td></tr><tr><td>> 30</td><td>No</td><td>Yes</td><td>fit</td></tr></table>c) Use data in Q.5(b) to predict fitness of person having attributes as age < 30 , Eat fastfood = No , and Do exercise = yes using Bayesian Classifier.</td><td>16</td><td>Apply</td><td>3</td></tr>
<tr><td>Q.6</td><td>Attempt any three:
a) Explain significance of cost vs parameter curve in linear regression.
b) Explain feature scaling.
c) Write hypothesis function for logistic regression.
d) What is entropy? How is it calculated.</td><td>12</td><td>Understand</td><td>1</td></tr>
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