Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 08

M.Tech. (CSE)E-I (2018 Batch) (Sem.–1)

MACHINE LEARNING

Subject Code : MTCS-105-18

M.Code : 75155

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWELVE marks.**

1. A confusion matrix is a table that is often used to describe the performance of a classification model on a set of test data for which the true values are known. Consider the confusion matrix given and answer the following questions briefly.

	Actual Positive	*Actual Negative*
Predicted Positive	42 (*TP*)	16 (*FP*)
Predicted Negative	13 (*FN*)	29 (*TN*)

   a) What is the meaning of Precision, Recall and F-measure? How they can be correlated with the confusion matrix?

   b) Calculate the value of Precision, Recall, Accuracy and F-measure using the confusion matrix given above.

2. What are Supervised learning techniques? Which of the following is an example of a Supervised learning technique? Justify your answer.

   a) SVM

   b) K-Means clustering

3. a) How PCA is different from SVD? How you will decide in which scenario? Which feature reduction technique is used?

   b) "*Logistic regression can be considered as a supervised learning technique*. Justify this statement. How logistic regression is different from linear regression.

4. A dealer has a warehouse that stores a variety of fruits and vegetables. When fruit is brought to the warehouse, various types of fruit may be mixed together. The dealer wants a model that will sort the fruit according to type. Justify with reason how decision tree is efficient compared to other feature based classification technique. Further can we improve the algorithm using random forest? Explain with an example.

5. a) R-Squared or Coefficient of determination value is a statistical measure of how close the data are to the fitted regression line. Whether high or low value of R^2 is required to get the perfect fitting line? Show with an example.

   b) KNN uses the concept of feature similarity in which parameter tuning *i.e.* choosing the right value of K is important for better accuracy. Which parameters can be used for choosing the right value of K, explain with example?

6. Deep Learning has become the main driver of many new applications and it's time to really look at why this is the case. With so many other options that we have been using for so long, why Deep Learning is getting so popular these days? Give some examples where deep learning can be used.

7. a) "*People who bought this also bought...*" recommendations seen on Amazon is based on which algorithm? Explain in detail.

   b) Explain how an agent can take action to move from one state to other state with the help of rewards.

8. a) What is kernel? How kernel can be used with SVM to classify non-linearly separable data? Also, list standard kernel functions.

   b) We have decided to use a neural network to solve this problem. We have two choices: either to train a separate neural network for each of the diseases or to train a single neural network with one output neuron for each disease, but with a shared hidden layer. Which method do you prefer? Justify your answer.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.