Manarat International University (MIU)

Department of Computer Science and Engineering
Final Examination (Summer 2019)
Artificial Intelligence (CSE-411)

Full Marks: 40 Time: 2.5 Hour

Answer any 8 (Eight) questions. All questions are of equal value.

1	Explain **Perceptron Learning** algorithm. Why Perceptron Learning algorithm can't find the right solution for XOR classification problem.	3 + 2
2	What is **Gradient Descent** algorithm. Why do we need **back-propagation** algorithm to train an ANN model ?	2 + 3
3	Write the general algorithm for **Ensemble Method**. Can we ensemble multiple models of same Machine Learning algorithm?	3 + 2
4	Describe a method for constructing an ensemble of classifier. Explain how **Bagging** improves the generalization error.	3 + 2
5	Define $\mathbf{F_1}$ **measure**. Explain the concept of **Cost-Sensitive Learning**.	2 + 3
6	What is the intuition of a large margin classifier? Why **SVM** is an example of a large margin classifier?	2 + 3
7	What is **Clustering**? Explain different types of clustering.	5
8	Specify the steps of the **K-Means** algorithm.	5
9	The **K-Means** algorithm will in general converge to a local optima rather than a global one. Given this, how would you adapt the algorithm to increase the chances of finding a good solution.	5
10	Mahmudul Haque is evaluating different binary classification models. For his classification task, a false positive result is 5 times more expensive than a false negative result. He is evaluating four different model based on the following criteria: 1) Must have a recall rate of at least 80% 2) Must have a false positive rate of 10% or less 3) Must minimize business costs After creating each binary classification model, After evaluation, he generates the corresponding confusion matrix. Which of the following confusion matrix represents the model that satisfies the requirements? (Select the true option and explain it.) (a) TN = 91, FP = 9, FN = 22, TP = 78 (b) TN = 99, FP = 1, FN = 21, TP = 79 (c) TN = 96, FP = 4, FN = 10, TP = 90 (d) TN = 98, FP = 2, FN = 18, TP = 82 Hint: Make a table for above four option. Calculate Recall, FPR and cost for each option. Where Cost = 5 * FP + FN	5