End Semester Examination

Course Name: Foundations of Machine Learning **Code:** CS 564

Marks: 15 **Time:** 50 minutes

Answer ALL the questions

Make reasonable assumptions as and whenever necessary. You can answer the questions in any sequence. However, the answers to all the components of any particular question should appear together. Carefully read the instructions circulated in the group on Nov 24, 2021.

Q1. For any perceptron, the weights for the consecutive three iterations are observed as follows:

<0,1,1>, <1,1,0>, <1,1,0>

Will this perceptron converge? Justify your answer by proper intuitions.

Can a linear neuron compute X-OR? Explain your answer with appropriate intuitions.

2 +2

Q2. Does ensemble always perform better than the single classifier? Among Bagging and Boosting, which one performs better than the other and under what conditions? **2+2**

Q3. Explain with examples how vanishing gradient or exploding gradient causes problems in modeling a vanilla RNN. How can the parallel training be implemented in RNN? Explain the following statement with appropriate intuition: *HMM and RNN both are efficient sequence learning algorithms, but the expressibility of RNN is higher than HMM.* Give insightful explanation to the following statement: even though none of LSTM and GRU is clearly the winner, but they have their own appealing characteristics? **1.5+1.5+2+2**

==========

Best of Luck