National Institute of Technology Hamirpur
End Semester Examination, Even Sem, AY 2022-23
Deep Learning (CS-661)

Branch: B. Tech. CSE (DD)

Time: _____

Duration: 3 hours

Year/Sem: 4th/8th

Date: _____

Max. Marks = 50

Note 1: Attempt all questions from 1 to 5.
Note 2: If required to solve a question, make & and state your assumptions clearly.
Note 3: Calculators are allowed.

1.   **[5+5=10 marks]**

   (a) Explain how LSTM and GRU work. Suggest which one is likely to perform better in different scenario and why?

   (b) What are GANs? Compare the variational autoencoder and GANs.

2.   **[5+5=10 marks]**

   (a) What are Seq2Seq (encoder-decoder) models? How is it different from autoencoders?

   (b) How can you evaluate the predictions in an object detection model? What makes a good feature for object recognition?

3.   **[5+5=10 marks]**

   (a) What is a one-hot vector? How can they be used in Natural Language Processing?

   (b) Explain the different modules for Dynamic Memory Networks.

4.   **[3+4+3=10 marks]**

   (a) What is the difference between a feedforward neural network and Recurrent Neural Network? Explain with suitable examples.

   (b) Calculate the output matrix size given that we have input image size =39x39x3.

       i. 10 filters of size 3x3, stride is 1, no padding

       ii. 5 filters of size 5x5, stride is 2, 'same' padding

   (c) Calculate the output if we have the following image and kernel.

1	3	5	2	4
6	0	2	1	3
6	3	1	3	6
7	3	2	1	3
5	3	0	0	2

0.2	0.7	0.5
-0.5	0.7	0.3
0.7	-0.4	-0.6

(a) Image   (b) Filter
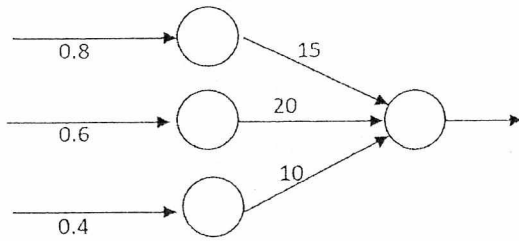
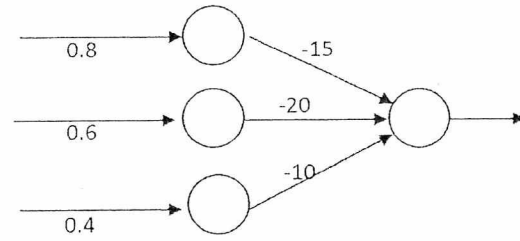5.   [4+6=10 marks]

(a) What is the difference between Single-Layer and Multi-Layer Perceptron?

(b) Given the following weights and inputs to the following neural networks, calculate the output of sigmoid and tanh activation functions for Network 1 and Network 2. Based on the output values, suggest the possible issues that can be observed while training the network.

(a) Network 1   (b) Network 2

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