MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

II SEMESTER M.TECH. (COMPUTER SCIENCE AND ENGINEERING)
END SEMESTER [MAKEUP] EXAMINATIONS, JUNE 2022
DEEP LEARNING [CSE 5051]

(OPEN ELECTIVE)
Date: 29/08/2022

Time: 3 Hours   MAX. MARKS: 50

Instructions: Answer ALL the questions.

1A. Sketch the Biological neurons and its equivalent artificial neural network with two neurons at input and one neuron at the output.   **2M**

1B. Interpret the following activation functions with their activation formulae and related graphs:

      i) Sigmoid   ii) Hyperbolic tangent   **3M**

1C. Using McCulloch Pitt model principles, design a neural network with XNOR gate functionality. Use the combination of available neural networks with functionalities OR, AND and NOR gates. x1 and x2 are the two inputs and Y is the output of the neural network. Analyze the complete neural network how it works.   **5M**
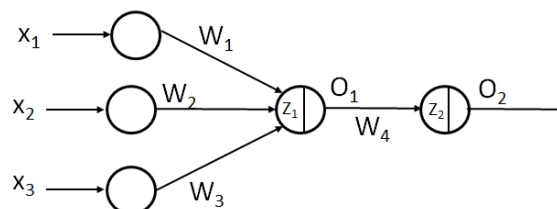
2A.

Fig. Q2A

For the neural network given in Fig. Q2A, examine and write down the equations and related derivative using chain-rule of differentiation to update the weight W_4 during Back propagation. The deduced derivative in your equations must be ready to substitute the numeric values directly. Assume that Y is the target output, $\hat{y}$ is the predicted value, η is the learning rate, O_i is the neuron output after applying activation function and L is loss seen at neuron at the output layer.   **4M**

2B. How do you organize the distribution of data among the large available data set in Artificial neural network for training and testing purposes?   **4M**

2C. Sketch the flow diagram of back propagation algorithm of a neural network.   **2M**

3A. Distinguish the methods to handle the underfitting and overfitting problems in deep neural network?   **4M**

3B. Recognize an algorithm with the steps involved in training a generalized Restricted Boltzmann Machine neural network (RBM). **3M**

3C. Relate with the mathematical equations to explain the general architecture of unfolded Recurrent neural network. **3M**

4A. How do you differentiate parameters, hyperparameters and hyperparameters tuning in a neural network? **2M**

4B. Use the supporting graph and explain how the Gradient descent optimizer works in a neural network. **4M**

4C. What is Padding in Convolutional neural network? Relate the types in Padding with example to explain how it works? **4M**

5A. Demonstrate how the Auto encoder works with appropriate diagram. **5M**

5B. Sketch the relevant diagram and explain how the Generator and the Discriminator training is done in Generative adversarial network. **5M**