Course Name: Neural Networks and Deep Learning

Course Outcome
CO1: Understanding of Neural Network architecture
CO2: Apply basic concepts of Deep Learning
CO3: Understanding of Recurrent Neural Network (RNN), LSTM, GRU
CO4: Apply basic concepts of Convolutional Neural Network (CNN)
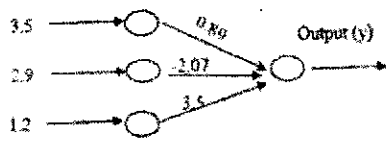CO5: Understanding of Generative AI and Pre-trained models

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Mid Term Examination, Odd Semester 2023-24
B. Tech. (Hons.), IIIrd Year, Vth Semester
Subject Code & Subject Name: BCSE0452 & Neural Networks and Deep Learning

Time: 1 Hour   **Maximum Marks: 15**

Section – A

Attempt All Questions   2 X 3 = 6 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	Suppose you have a neural network with three layers (input, hidden, output) and you want to calculate the gradient of the loss function with respect to the weights in the hidden layer. How would you apply the chain rule in this scenario?	2	2	A	C
2	For speech recognition purpose, a deep learning model needs to handle both the detection of phonemes (distinct speech sounds) and the final classification of spoken words. How might you use different activation functions to address these two tasks within the same model? Elaborate.	2	2	U	C
3	Mention the regularization method that leads to weight sparsity and explain briefly.	2	1	R	F

Attempt All Questions   3 X 3 = 9 Marks

No.	Detail of Question	Marks	CO	BL	KL
4	A 2 x 2 image is represented by the following pixel value matrix. $$\begin{bmatrix} 3 & 2 \\ 4 & 6 \end{bmatrix}$$ This image is given to a 3-layer neural network, that is, two hidden layers and one output layer. Draw schematic diagram of the network. Assuming all inter-connection weights having values 1, bias having value 0, the hidden layers having 3 neurons each, and a simple activation function of the form $(1/1 + x)$ being used, compute output for one round of forward propagation.	3	2	A	P
5	Explain back propagation algorithm for neural network training. Compute output of the following neuron if activation function is: (i) Sigmoid function (ii) Tanh function (iii) RELU function (assume same bias 0.5 for each node). 	3	1	An	C
6	i) Explain Gradient Descent with momentum. ii) Describe the importance of adding non-linearities between the layers of neural networks?	3	1	R	F