

(2) Attempt any three questions from the out of the remaining five questions.

(3) Assume suitable data if required and mention it clearly

(4) Figures to the right indicate full marks



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|-----|---|----|
| Q1. | Solve <i>any four</i> | 20 |
| a. | Explain following activation functions with appropriate graphs: tanh, sigmoid. | 5 |
| b. | Discuss Mc-Culloch Pitts model with respect to its capabilities and limitations. | 5 |
| c. | Explain Cross-Entropy and Mean squared Error (MSE) loss function. | 5 |
| d. | Explain the problem of exploding and vanishing gradients in RNN. | 5 |
| e. | Differentiate between convolutional neural network and recurrent neural network | 5 |
| Q2. | a. Differentiate between Momentum based and Adam Gradient Descent. | 10 |
| | b. Discuss the factors that affect the performance of the deep learning model. | 10 |
| Q3. | a. Apply discrete perceptron learning rule to obtain weights after 1 iteration for simulating 3 input OR gate. Assume learning rate $C=0.1$. Use bipolar binary activation function and initial weights $W = [1 \ -1 \ 0 \ -1]$. | 10 |
| | b. Compare and contrast undercomplete and overcomplete autoencoders. | |
| Q4. | a. Explain in detail working of convolution neural network with neat block diagram. | 10 |
| | b. Consider following image of size 5×5 and filter of size 3×3 and stride=1. Compute the output of the convolution operation using the given filter with and without padding followed by maxpooling with a 2×2 filter. | 10 |

Filter=

0	1	0
1	1	1
0	1	0

Image =

3	2	3	13	4
2	12	3	2	12
3	9	4	12	12
2	3	11	6	3
4	12	12	9	3

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|-----|--|----|
| Q5. | a. Explain back-propagation through time (BPTT) algorithm for training RNN. | 10 |
| | b. Explain the LSTM architecture in detail with neat block diagrams. | 10 |
| Q6. | Solve <i>any two</i> | 20 |
| | a. Write a short note on applications of denoising autoencoders. | |
| | b. Explain in short working of GAN models. | |
| | c. What are regularization techniques? Explain different regularization methods. | |

Q P code

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