Time: 3 Hours   **Total Marks: 80**

N.B.:   **80 Marks**
(1) Q. 1 is compulsory.
(2) Attempt any three out of the remaining five.
(3) Figures to the right indicate full marks.

Q.1		Write a Short Note on Any Four	
	A	What is the McCulloch-Pitts unit, and how does it function?	**5**
	B	Discuss Gradient-Based Learning	**5**
	C	Discuss Dataset Augmentation Technique	**5**
	D	Write a short note on the Applications of Deep Learning	**5**
	E	Write a short note on Multi Task Learning	**5**
Q.2	**A**	What is a Multilayer Perceptron (MLP), and how does it differ from a single-layer perceptron? Also Explain the forward pass and backward pass during the training of an MLP?	**10**
	B	What is regularization? Explain how regularization techniques dropout and early stopping can help prevent overfitting.	**10**
Q.3	**A**	What is the purpose of adaptive learning rate algorithms in optimization? Explain the AdaGrad algorithm and its key components.	**10**
	B	What is a Convolutional Neural Network (CNN), and how does it differ from fully connected neural networks?	**10**
Q.4	**A**	Discuss Learning XOR in Deep Feed-forward Networks.	**10**
	B	What is the basic architecture of a Convolutional Neural Network? Discuss the key components of a CNN architecture	**10**
Q.5	**A**	Explain the concept of recurrence and how it allows RNNs to handle sequential data?	**10**
	B	How does bagging, as an ensemble method, contribute to regularization?	**10**
Q.6	**A**	Define RNN. Discuss the encoder-decoder architecture in detail.	**10**
	B	Describe the backpropagation algorithm step by step.	**10**

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