Duration: 3hrs **Marks:80**

(1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any **four**	[20]
	a)	Explain basic architecture of feedforward neural network.	
	b)	Explain regularization in neural network.	
	c)	Explain types of neural network.	
	d)	Explain the concept of overfitting and under fitting in neural network.	
	e)	Explain basic working of CNN.	
2	a)	Explain the gradient descent algorithm used in neural network. Also discuss types of gradient descent in detail.	[10]
	b)	Explain the working of auto encoders. Also discuss type of auto encoders in detail.	[10]
3	a)	Draw and explain any two modern deep learning architectures.	[10]
	b)	Differentiate between the LSTM and GRU network.	[10]
4	a)	Explain the working of RNN with the help of suitable diagram.	[10]
	b)	Explain how Recurrent Neural Networks (RNNs) are suited for sequential data. Compare the standard RNN architecture with Long Short-Term Memory (LSTM) networks in terms of their ability to handle long-term dependencies. Provide a real-world application where using an LSTM would be significantly more beneficial than a simple RNN and justify your reasoning.	[10]
5	a)	Discuss the role of a loss function in training a neural network. Compare Mean Squared Error (MSE) and Cross-Entropy Loss in terms of their usage, characteristics, and impact on model performance. In which scenarios would using Cross-Entropy Loss be more appropriate than MSE? Justify your answer with a suitable example.	[10]
	b)	Explain architecture of GAN in detail. Also comment on applications of GAN.	[10]
6	a)	What is the significance of Activation Functions in Neural Networks, explain different types Activation functions used in NN.	[10]
	b)	Explain the learning process in a neural network. How does a neural network update its weights during training? Describe the role of forward propagation, loss calculation, backpropagation, and optimization in this learning process.	[10]

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