Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA INTEGRATED - SEMESTER - VIII EXAMINATION - WINTER 2025

Subject Code: 2688602 **Date: 17-11-2025**

Subject Name: Advance Machine Learning

Time: 02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions

1. Attempt all questions.

2. Make suitable assumptions wherever necessary.

3. Figures to the right indicate full marks.

4. Use of simple calculators and non-programmable scientific calculators are permitted.

			Marks
Q.1	**(a)**	**Answer the following:** 1. What is the vanishing gradient problem in deep neural networks? 2. What does a Convolutional Neural Network (CNN) mainly help with? 3. What is the full form of LSTM in the context of Recurrent Neural Networks? 4. In GANs, what is the role of the discriminator? 5. Which OpenCV function is used to rotate an image? 6. What does 'Q' represent in Q-learning in Reinforcement Learning? 7. Which Python library is commonly used for reading and saving images in deep learning projects?	**07**
	(b)	Explain the key differences between Machine Learning and Deep Learning.	**07**
Q.2	**(a)**	Describe the working of a shallow neural network. How does it differ from a deep neural network?	**07**
	(b)	Explain the vanishing gradient and exploding gradient problems in deep neural networks.	**07**
		OR	
	(b)	Write short notes on any four of the following deep learning frameworks: TensorFlow, Theano, PlaidML, MXNet, CNTK, Keras.	**07**
Q.3	**(a)**	What is Long Short-Term Memory (LSTM)? Describe its internal architecture.	**07**
	(b)	Explain the working of a Convolutional Neural Network (CNN) with real life example.	**07**
		OR	
	(a)	What is the importance of activation function? Explain in brief Sigmoid and Relu activation functions.	**07**
	(b)	Imagine an autonomous car learning to drive using Reinforcement Learning. Define Environment, State, Reward, Policy, and Value for this scenario.	**07**
Q.4	**(a)**	Explain the roles of the Generator and Discriminator in the GAN framework. How do they interact during the training process?	**07**
	(b)	Explain the basic concepts of Reinforcement Learning (RL).	**07**

OR

	(a)	What is Sequential Decision-Making in Reinforcement Learning? Describe how it differs from simple decision-making and why it is important in RL.	**07**
	(b)	What is a Markov Decision Process (MDP)? Explain the components of MDP.	**07**
Q.5	**(a)**	Compare Q-Learning and SARSA algorithms.	**07**
	(b)	Explain the concept of Natural Language Processing (NLP) and discuss its significance in modern AI applications.	**07**

OR

	(a)	Explain the concept of Part of Speech Tagging (POS) with Hidden Markov Models (HMMs).	**07**
	(b)	Discuss the application of NLP in Web 2.0 through Sentiment Analysis.	**07**

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