UPES
End Semester Examination, December 2024

Course: Deep Learning   Semester: V
Program: B.Tech CSE AI/ML   Time : 03 hrs.
Course Code: CSCS3003   Max. Marks: 100

Instructions: All questions are compulsory.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
1	Explain the concept of activation functions in Deep Learning and their importance in neural networks.	4	CO1
2	Compare and contrast supervised and unsupervised learning techniques, focusing on their strengths and limitations in handling complex datasets in deep learning.	4	CO1
3	Describe the role of backpropagation in training a neural network.	4	CO2
4	Assess the effectiveness of backpropagation in optimizing neural networks compared to other training methods.	4	CO2
5	Identify an example scenario in deep learning where the vanishing gradient problem might arise and describe its impact on model performance.	4	CO3

SECTION B
(4Qx10M= 40 Marks)

6	Discuss convolutional neural networks (CNNs), focusing on their architecture and applications. Explain how they are different from fully connected networks.	10	CO2
7	Explain the architecture and working of recurrent neural networks (RNNs). Provide examples of applications where RNNs are most effective.	10	CO3
8	Explain the benefits of transfer learning and why it is especially useful for complex tasks in deep learning.	10	CO2
9	Discuss the process and importance of hyperparameter tuning in neural network training. How do techniques like grid search and random search help in this process?

Or | 10 | CO4` |

	Discuss the architecture of transformers and explain their impact on natural language processing tasks.		
	SECTION-C **(2Qx20M=40 Marks)**		
10	Provide a detailed explanation of Generative Adversarial Networks (GANs). Discuss their architecture, how they work, and some of the challenges associated with training GANs. Give examples of applications where GANs have been successfully used.	**20**	**CO4**
11	Design a deep learning model for sentiment analysis on social media. Outline your choice of network type (CNN/RNN/Transformer), preprocessing steps, and evaluation metrics for the model. Or A company wants to deploy a deep learning model for image segmentation in medical imaging. Describe the process from data collection to model training and validation, detailing each stage and considerations like hyperparameter tuning and avoiding overfitting.	**20**	**CO3**