

School of Computing Science and Engineering

**Bachelor of Technology in Computer Science and Engineering
Semester End Examination - Jun 2024**

**Duration : 180 Minutes
Max Marks : 100**

Sem VI - R1UC604C - Deep Learning

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- | | | |
|-----|---|--------|
| 1) | Define the importance of hyperparameters. | K1(2) |
| 2) | Justify the difference between deep learning and machine learning | K2(4) |
| 3) | Illustrate any one challenge associated with ANN with the help of diagram | K2(6) |
| 4) | Compare the applications of AI, Machine Learning, and Deep Learning | K3(9) |
| 5) | Model the operation of pooling layer in CNN with simple example. | K3(9) |
| 6) | Explain the concept of Generative Adversarial Networks (GANs) in deep learning comprehensively. Cover their architecture, training process, and applications. Discuss potential challenges faced in GAN training and present techniques to mitigate these challenges. Finally, elaborate on a real-world application of GANs, highlighting their impact and significance. | K5(10) |
| 7) | a. Define the concept of pre-trained image classification models and their significance in computer vision (3 marks). b. Choose a specific pre-trained image classification model (e.g., ResNet, VGG) and analyze its performance on a diverse set of images (3 marks). c. Investigate different strategies for fine-tuning the chosen pre-trained model on a specific image classification task (3 marks). d. Analyze the impact of fine-tuning hyperparameters and the number of layers on the model's performance (3 marks). | K4(12) |
| 8) | Consider a 4 input, 1 output parity detector. The output is 1 if the number of inputs is even. Otherwise, it is 0. Is this problem linearly separable? Justify your answer. | K5(15) |
| 9) | Evaluate a multi-layer model (input layer, hidden layer with tanh activation and one output layer) which will be used to classify the images from the CIFAR10 dataset. You can use the built-in modules in PyTorch to build your model, such as Linear, Dropout, Tanh, etc. | K5(15) |
| 10) | Build a diagram to explain the working Perceptron model and its similarity to human brain. | K6(18) |