*R22 Regulation* *Subject code:4E6HC*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech VI Semester Supplementary Examinations, November 2025**

## DEEP LEARNING AND NEURAL NETWORK

*(CSE(DS))*

***Maximum Marks: 60*** Date:11.11.2025 Duration: 3 hours

**Note:** **1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.**
**3. Part B consists of 5 Units. Answer any one full question from each unit.**
**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

| All the following questions carry equal marks (10X1M=10 Marks) | | Marks | CO | Bloom Tx |
|---|---|---|---|---|
| 1.a) | List out some supervised learning algorithms. | 1M | CO1 | I |
| b) | What is bias-variance tradeoff? | 1M | CO1 | I |
| c) | XOR function is not linearly separable. Why? | 1M | CO2 | II |
| d) | Compare Dropout training with bagging training. | 1M | CO2 | II |
| e) | Give the benefit of using momentum method in optimization. | 1M | CO3 | I |
| f) | Mention the typical applications of convolutional neural networks. | 1M | CO3 | I |
| g) | List the two advantages of unfolding in a recurrent structure. | 1M | CO4 | I |
| h) | What are leaky units in RNN? | 1M | CO4 | I |
| i) | Differentiate Autoencoder and Denoising Autoencoder. | 1M | CO5 | II |
| j) | Give the applications of Autoencoders. | 1M | CO5 | I |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | Bloom Tx |
|---|---|---|---|---|
| 2 | Describe the Stochastic Gradient Descent optimization algorithm in detail. | 10M | CO1 | III |
| | OR | | | |
| 3 | Explain the phenomena of overfitting and underfitting in machine learning models. Provide examples of each and discuss strategies to mitigate these issues. | 10M | CO1 | IV |
| 4 | Give an account of the following:<br>(a) Back propagation algorithm for neural network training.<br>(b) Applications of Dataset Augmentation. | 5M<br>5M | CO2 | III |
| | OR | | | |
| 5 | Present an account of $L^2$ Parameter Regularization and $L^1$ Regularization and offer a comparison among them. | 10M | CO2 | IV |
| 6 | Analyze the role of pooling layers in convolutional neural networks. Compare and contrast different pooling strategies and assess their impact on model performance and computational efficiency. | 10M | CO3 | IV |

| | | | | |
|---|---|---|---|---|
| | OR | | | |
| 7 | Create a table with examples of different formats of data that can be used with convolutional networks. | 10M | CO3 | IV |
| 8 | Give a brief account of the architecture of a RNN and discuss how to compute the gradient in a Recurrent Neural Network. | 10M | CO4 | III |
| | OR | | | |
| 9 | Discuss the application of Bidirectional RNN in the processing steps of a typical automatic speech recognition system. | 10M | CO4 | III |
| 10 | Write short notes on the following:<br>(a) Contractive Autoencoders<br>(b) stochastic Encoders and Decoders. | 5M<br>5M | CO5 | III |
| | OR | | | |
| 11 | Explain the concept of undercomplete autoencoders, highlighting their architecture, working mechanism and applications. | 10M | CO5 | III |