Printed Page:- 03 **Subject Code:- AEC0613**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: VI - THEORY EXAMINATION (2023 - 2024)
Subject: ANN & Deep Learning

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. A possible neuron specification to solve the AND problem requires a minimum of- (CO1) 1

(a) Single Neuron
(b) Two Neuron
(c) Three neuron
(d) Four Neuron

1-b. What is supervised learning? (CO1) 1

(a) weight adjustment based on deviation of desired output from actual output
(b) weight adjustment based on desired output only
(c) weight adjustment based on actual output only
(d) none of the mentioned

1-c. What is the advantage of using Momentum-based Gradient Descent? (CO2) 1

(a) It converges faster than Gradient Descent
(b) It avoids overfitting
(c) It is less prone to local minima
(d) It guarantees global minimum

1-d. What is Principal Component Analysis (PCA)? (CO2) 1

(a) A type of regression analysis
(b) A technique used to reduce the dimensions of a dataset

(c) A method to calculate the standard deviation of a dataset
(d) A type of clustering algorithm

1-e. What is the Bias-Variance tradeoff in machine learning? (CO3) 1

(a) The tradeoff between model complexity and training time
(b) The tradeoff between underfitting and overfitting
(c) The tradeoff between training set error and test set error
(d) The tradeoff between accuracy and interpretability

1-f. What is the effect of L2 regularization? (CO3) 1

(a) A technique for reducing bias in machine learning models
(b) A technique for reducing variance in machine learning models
(c) A technique for reducing overfitting in machine learning models
(d) A technique for reducing underfitting in machine learning models

1-g. The first layer is called the (CO4) 1

(a) Input layer
(b) outer layer
(c) hidden layer
(d) none of the above

1-h. RNNs stands for-(CO4) 1

(a) Recurrent neural network
(b) recall network
(c) report NN
(d) None of the above

1-i. What does LSTM stand for? (CO5) 1

(a) Long Short-Term Memory
(b) Linear Short-Term Memory
(c) Large-Scale Temporal Memory
(d) Low-Level Sequential Memory

1-j. Which of the following is NOT a key component of an LSTM network? (CO5) 1

(a) Forget gate
(b) Input gate
(c) Memory gate
(d) Output gate

2. Attempt all parts:-

2.a. Give some real-world applications of ANN. (CO1) 2

2.b. Define learning rate in Gradient Descent. (CO2) 2

2.c. Elaborate variance with suitable diagram. (CO3) 2

2.d. List down the hyperparameters of a Pooling Layer. (CO4) 2

2.e.	How is a GRU different from a traditional recurrent neural network (RNN)? (CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Discuss Reinforcement learning in detail. (CO1)	6
3-b.	Implement AND function using ANN? (CO1)	6
3-c.	Explain the principal component analysis. (CO2)	6
3-d.	Write the short note on gradient descent. (CO2)	6
3.e.	Elaborate the role of Softmax in deep learning. (CO3)	6
3.f.	An input image has been converted into a matrix of size 12 X 12 along with a filter of size 3 X 3 with a Stride of 1. Determine the size of the convoluted matrix. (CO4)	6
3.g.	Write the short note on turncatted backpropagation through time (BPTT). (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Compute the N/W output for x1=0.2, x2=0.4, and bias b=1 with weight 0.2 for binary activation function. Assume w1=w2=1. (CO1)	10
4-b.	Write short note on latest trends in AI technology. (CO1)	10

5. Answer any one of the following:-

5-a.	Describe gradient descent with figure and also write its advantage and disadvantage. (CO2)	10
5-b.	Write the short note on autoencoder, denoising autoencoder and sparse autoencoder. (CO2)	10

6. Answer any one of the following:-

6-a.	Write short note on the following: (i) ReLU activation function, (ii) sigmoid function, (iii) tanh (iv) linear activation function (v) Leaky ReLU activation function. (CO3)	10
6-b.	Write short note on the following: (i) Preprocessing of data set, (ii) vector representation of words (CO3)	10

7. Answer any one of the following:-

7-a.	Discuss the working of the DenseNet with suitable architecture. (CO4)	10
7-b.	Discuss the working of the VGGNet with suitable architecture. (CO4)	10

8. Answer any one of the following:-

8-a.	Describe in detail all the gates used in GRU. (CO5)	10
8-b.	Draw and explain the architecture of recurrent neural network (RNN) network. (CO5)	10