**Printed Page:-** 04 **Subject Code**:- **AEC0613**

**Roll. No:**

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**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**

**(An Autonomous Institute Affiliated to AKTU, Lucknow)**

**B.Tech**

**SEM: VI - THEORY EXAMINATION (** 2022-2023 **)**

**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. Why do we need biological neural networks? (CO1) 1

(a) to solve tasks like machine vision & natural language processing

(b) to apply heuristic search methods to find solutions of problem

(c) to make smart human interactive & user friendly system

(d) all of the mentioned

1-b. What is the purpose of the hidden layers in a Multilayer Perceptron? (CO1) 1

(a) To reduce the number of features in the input data

(b) To extract relevant features from the input data

(c) To increase the complexity of the model

(d) To decrease the complexity of the model

1-c. What is Gradient Descent? (CO2) 1

(a) An optimization algorithm

(b) A machine learning model

(c) A deep learning framework

(d) An activation function

1-d. How is the amount of variance explained by each principal component calculated? (CO2) 1

(a) By dividing the eigenvalue of each component by the total sum of eigenvalues

(b) By calculating the mean of each component

(c) By multiplying the eigenvalue of each component by the total sum of eigenvalues

(d) By dividing the total sum of eigenvalues by the number of components

1-e. What is the impact of increasing model complexity on the bias-variance tradeoff? (CO3) 1

(a) It increases bias and decreases variance

(b) It increases variance and decreases bias

(c) It increases both bias and variance

(d) It decreases both bias and variance

1-f. Mention an example that is not part of dataset augmentation? (CO3) 1

(a) Flipping an image horizontally

(b) Rotating an image by a few degrees

(c) Changing the brightness of an image

(d) Removing noisy pixels from an image

1-g. In which of the following applications can we use deep learning to solve the problem? (CO4) 1

(a) Protein structure prediction

(b) Prediction of chemical reactions

(c) Detection of exotic particles

(d) All of the above

1-h. ANN model is the preliminary model of CNN. (CO4) 1

(a) TRUE

(b) FALSE

(c) Partially

(d) None of these

1-i. How does BPTT differ from regular Backpropagation (BP) in a feedforward neural network? (CO5) 1

(a) BP only updates the weights of the network, while BPTT updates the

weights and the biases

(b) BP uses a different optimization algorithm than BPT

(c) BP only considers the current input and output, while BPTT takes into account the entire input sequence and its corresponding output sequence

(d) BP only updates the output layer of the network, while BPTT updates all layers of the network

1-j. In a machine translation task using an encoder-decoder model, what is typically used as the input to the encoder? (CO5) 1

(a) The target language sentence

(b) The source language sentence

(c) A mixture of source and target language sentences

(d) None of the above

**2. Attempt all parts:-**

2.a. Explain binary activation function. (CO1) 2

2.b. What is the relationship between singular value decomposition and eigenvalue decomposition? (CO2) 2

2.c. How an early stopping can be defined? (CO3) 2

2.d. Explain the Stride, and Padding terms. (CO4) 2

2.e. What is the basic idea behind LSTM networks? (CO5) 2

**SECTION B** **30**

**3. Answer any <u>five</u> of the following:-**

3-a. What are the three classifications of ANN? (CO1) 6

3-b. Implement AND function using ANN? (CO1) 6

3-c. How does a denoising autoencoder work, and what are some of its applications? (CO2) 6

3-d. Explain the principal component analysis. (CO2) 6

3.e. Explain the weight updation process in Artificial neural network. (CO3) 6

3.f. How are weights initialized in a Network? (CO4) 6

3.g. What is backpropagation through time (BPTT) and how is it used in recurrent neural networks (RNNs)? (CO5) 6

**SECTION C** **50**

**4. Answer any <u>one</u> of the following:-**

4-a. What is multilayer perceptron? Illustrate with suitable diagram. (CO1) 10

| | | |
|---|---|---|
| 4-b. | Implement XOR, AND gate using Mc Culloch Pitts mode. (CO1) | 10 |

**5. Answer any <u>one</u> of the following:-**

| | | |
|---|---|---|
| 5-a. | Write the short note on gradient descent and it can one improve the performance of machine learning model. (CO2) | 10 |
| 5-b. | What is momentum based gradient descent? Write the difference between batch gradient descent and stochastic gradient descent. (CO2) | 10 |

**6. Answer any <u>one</u> of the following:-**

| | | |
|---|---|---|
| 6-a. | Explain the terms (i) bias and variance, (ii) data augmentation (iii) Batch normalization (iv) Softmax Layer. (CO3) | 10 |
| 6-b. | What is learning vectorial representations of words. Explain with suitable example. (CO3) | 10 |

**7. Answer any <u>one</u> of the following:-**

| | | |
|---|---|---|
| 7-a. | Explain the DenseNet classifier model with its proper architecture. (CO4) | 10 |
| 7-b. | What are the advantages and disadvantages of ResNet over AlexNet? (CO4) | 10 |

**8. Answer any <u>one</u> of the following:-**

| | | |
|---|---|---|
| 8-a. | Write the short note on Truncated BBTT and long short-term memory network. (CO5) | 10 |
| 8-b. | Write the short note on recurrent neural network and Gated Recurrent Unit (GRU). (CO5) | 10 |