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

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM:VI CARRY OVER THEORY EXAMINATION-AUGUST 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. Conventional Artificial Intelligence is different from soft computing in the sense. (CO1) 1

(a) Conventional Artificial Intelligence deal with prdicate logic where as soft computing deal with fuzzy logic

(b) Conventional Artificial Intelligence methods are limited by symbols where as soft computing is based on empirical data

(c) Both (a) and (b)

(d) None of the above

1-b. When was the term "deep learning" coined? (CO1) 1

(a) 1980s

(b) 1990s

(c) 2000s

(d) 2010s

1-c. What is the maximum number of principal components that can be calculated in PCA? (CO2) 1

(a) The number of data points in the dataset

(b) The number of variables in the dataset

(c) The number of dimensions in the dataset

(d) The minimum of the number of variables and dimensions in the dataset

1-d. Which of the following is a common application of singular value decomposition? (CO2) 1

(a) Image compression

(b) Solving systems of linear equations

(c) Polynomial regression

(d) Principal component analysis

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

(a) It increases bias and decreases variance

(b) It increases variance and decreases bias

(c) It decreases both bias and variance

(d) It increases both bias and variance

1-f. Which of the following is a common way to reduce model bias? (CO3) 1

(a) Increase model complexity

(b) Decrease model complexity

(c) Increase regularization

(d) Decrease regularization

1-g. What is the error rate of AlexNet? (CO4) 1

(a) 0.25

(b) 0.5

(c) 0.7

(d) 0.8

1-h. Which of the following is limitations of deep learning? (CO4) 1

(a) Data labelling

(b) need huge training data

(c) Both A & B

(d) none of the above

1-i. Which of the following is a disadvantage of using LSTM networks? (CO5) 1

(a) They are computationally expensive.

(b) They are difficult to train.

(c) They are not effective at modeling sequential data.

(d) They are prone to overfitting.

1-j. What is the purpose of RNN? (CO5) 1

(a) To analyze static data

(b) To analyze dynamic data

(c) To analyze image data

(d) To analyze audio data

2. Attempt all parts:-

2.a. Define Supervised learning. (CO1) 2

2.b. What is the role of the left and right singular vectors in singular value decomposition? (CO2) 2

2.c. Define type I error with suitable example? (CO3) 2

2.d. Explain the significance of the RELU Activation function in Convolution Neural Network. (CO4) 2

2.e. What is the difference between LSTM network and GRU network. (CO5) 2

SECTION B **30**

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

3-a. Discuss unsupervised learning in detail. (CO1) 6

3-b. Discuss the design parameters of ANN. (CO1) 6

3-c. What is the purpose of principal component analysis (PCA) in data analysis, and how is it different from other dimensionality reduction techniques? (CO2) 6

3-d. Write the short note on stochastic gradient descent. (CO2) 6

3.e. Discuss the importance of softmax in CNN. (CO3) 6

3.f. What are the main steps of CNN? Explain in detail. (CO4) 6

3.g. Explain the RNNs with the help of suitable diagram. (CO5) 6

SECTION C **50**

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

4-a. Explain the use of artificial intelligence in manufacturing industry. (CO1) 10

4-b. Implement AND and OR gate using Mc Culloch Pitts mode. (CO1) 10

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

5-a. What are practical applications of PCA in industry and research? Explain in details. (CO2) 10

5-b.	Describe Nesterov accelerated gradient descent with figure and also write advantage and disadvantage. (CO2)	10

6. Answer any <u>one</u> 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.	How does the error gets minimized using the back propagation? Explain with proper example. (CO3)	10

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

7-a.	How does VGG work? Explain with suitable architecture. (CO4)	10
7-b.	Elaborate the working of ResNet with suitable diagram. (CO4)	10

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

8-a.	How does the vanishing gradient problem arise in BPTT, and what are some techniques for mitigating it? (CO5)	10
8-b.	How does LSTM compare to RNN network? Also explain the LSTM in details. (CO5)	10