

**Seventh Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025**  
**Deep Learning**

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

**Module-1**

- 1 a. Explain the concept of tasks(T), Performance (P) and Experience (E). Describe the following with respect to tasks performance and experience.
  - i) Checker learning problem
  - ii) Handwriting recognition learning problem

(12 Marks)
- b. Explain the concept of supervised and unsupervised learning with example. 

(08 Marks)

**OR**

- 2 a. Explain the historical trends in deep learning. 

(10 Marks)
- b. Define supervised and unsupervised learning algorithm. Describe KNN and K means algorithm. 

(10 Marks)

**Module-2**

- 3 a. Explain about gradient based learning. 

(10 Marks)
- b. Explain the concept of Back propagation and how it helps in a Neural network. 

(10 Marks)

**OR**

- 4 a. Define Regularization. Describe  $L^1$  and  $L^2$  regularization. 

(10 Marks)
- b. Given  $W = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ ,  $C = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$ ,  $W = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$  and  $b = 0$  draw feed forward network and evaluate XOR function. 

(10 Marks)

**Module-3**

- 5 a. What are the challenges in neural network optimization? 

(10 Marks)
- b. Explain the following algorithms
  - i) RMSProp
  - ii) RMSProp with momentum.

(10 Marks)

**OR**

- 6 a. Explain stochastic gradient descent and momentum algorithms 

(10 Marks)

- b. Give the list of adaptive learning rates algorithms. Write the Ada Grad algorithm. (10 Marks)

**Module-4**

- 7 a. Explain the following with suitable diagram.  
i) Sparse interactions ii) Parameter sharing. (10 Marks)
- b. Explain briefly variant of the CNN models. (10 Marks)

**OR**

- 8 a. Differentiate locally connected layers, tiled convolution and standard convolution with suitable example and diagram. (10 Marks)
- b. Explain the different layers in CNN models and its function with a neat diagram. (10 Marks)

**Module-5**

- 9 a. Discuss about Bidirectional Recurrent neural networks. (10 Marks)
- b. What is speech recognition? Explain the different types of speech recognition systems. (10 Marks)

**OR**

- 10 a. Explain Long Short-Term Memory (LSTM) working principles along with all the equations. (10 Marks)
- b. What is Natural language processing? Explain different steps involved in NLP. (10 Marks)

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