

M.Sc. I.T. Sem-IV-75:25

dt-14/01/2025

(3Hours)

[Total Marks: 75]

N. B.: (1) All questions are compulsory.

(2) Make suitable assumptions wherever necessary and state the assumptions made.

(3) Answers to the same question must be written together.

(4) Numbers to the right indicate marks.

(5) Draw neat labelled diagrams wherever necessary.

(6) Use of Non-programmable calculators is allowed.

**Q1. Attempt the three of the following.**

**15 Marks**

- Differentiate between scalar and vector
- Write Properties of dot products
- Explain Softmax function in detail
- Define Local minimum
- Explain Constraint Optimization ways.

**Q2. Attempt the three of the following.**

**15 Marks**

- Define and explain Deep Networks with example?
- What Simple Deep Neural Network? Explain with Example.
- Explain Gradient-Based Learning?
- Define Regularizaion wit example?
- Define Underfitting and overfitting.

**Q3. Attempt three of the following.**

**15 marks**

- What is convolution neural network? How it is different from neural network
- Explain different types of data types
- Write a note on Convolution algorithm.
- What is sequence modelling? State its applications
- Explain deep learning application with reference to Natural Language Processing

**Q4. Attempt three of the following.**

**15 marks**

- What are Linear factor Models
- What is Sparse coding?
- What are Autoencoders?
- What is the significance of Denoising Autoencoders-
- List Applications of Autoencoders

**Q5. Attempt three of the following.**

**15 marks**

- Explain how approximate Inference works machine learning
- Compare Supervised and Unsupervised Learning
- Explain Conditional GANs
- Explain Restricted Boltzmann Machines
- Explain Deep Belief Networks with its working.