M.Sc. (IT) (Sem -IV) July-2023

Information Technology : Deep Learning (R-2021)

(2 Hours) **[Total Marks: 60]**

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 labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

Q1. Attempt the three of the following. **[12]**
a. Differentiate between scalar and vector.
b. Explain the Inverse matrix with an example.
c. What is a need for Gradient Optimization? and, Explain in detail.
d. Explain Constraint Optimization ways.

Q2. Attempt the three of the following. **[12]**
a. Define and explain Deep Networks with examples?
b. How to compute Deep Neural Networks. Explain.
c. Define Underfitting and overfitting.
d. Define Plateaus, Saddle Points, and Other Flat Regions. Explain with Diagram.

Q3. Attempt the three of the following. **[12]**
a. What is Pooling? Explain the role of pooling.
b. Give a comparison between recurrent neural networks and convolutional neural network.
c. What is sequence modelling? State its applications.
d. Explain deep learning's role in speech recognition.

Q4. Attempt the three of the following. **[12]**
a. What are Linear factor Models?
b. Compare Factor Analysis & Independent Component Analysis
c. What are Autoencoders?
d. Write a short not on the importance of Representation learning in deep learning.

Q5. Attempt the three of the following. **[12]**
a. Explain how approximate Inference works in machine learning.
b. Write Maximum a Posteriori (MAP) algorithm
c. Write a short note on Boltzmann Machines
d. Explain the Expectation Maximization algorithm.

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