

(Time: 2½ 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 calculator is allowed.

1. Attempt any two of the following: 12
  - a. Explain Softmax function in detail.
  - b. Define Minimum, Maximum and Saddle point.
  - c. Compare Symmetric Matrix and Orthogonal Matrix.
  - d. Write a short note on a linear combination.
  
2. Attempt any two of the following: 12
  - a. Describe the Deep feedforward network with its types.
  - b. Explain in brief Gradient-Based Learning.
  - c. Write a short note on Underfitting and overfitting.
  - d. What is Dropout? Explain in detail.
  
3. Attempt any two of the following: 12
  - a. Give a comparison between Exploration and Exploitation.
  - b. Explain different types of Recurrent Neural Network .
  - c. Explain the classification process using sequence modeling.
  - d. Explain padding in Convolution Neural Network.
  
4. Attempt any two of the following: 12
  - a. Write a short note on the importance of Representation learning in deep learning.
  - b. Explain in brief about Autoencoders.
  - c. Write a short note on Linear Factor Models.
  - d. Write a short note on Slow feature analysis
  
5. Attempt any two of the following: 12
  - a. Write a short note on Boltzmann Machines.
  - b. Explain Conditional GANs in brief.
  - c. Explain the relationship between approximate Inference deep learning.
  - d. Write Maximum a Posteriori (MAP) algorithm.