Assignment -2

1. **a) Define** Convolutional Neural Networks. **List** the main components and their functions in a CNN architecture.

   b) Explain how representation learning works in CNNs. **Why** is it important in deep learning tasks?

2. **a) Illustrate** the role and working of **Convolutional Layers** with a neat diagram and example.
   b) What is multichannel convolution? **Describe** with an example how convolution operation works on RGB images.

3. **a) Write and Explain** a simple RNN implementation using Python or PyTorch code.

   b) What are PyTorch Tensors? **List** their basic operations with examples.

4. **a)** Define *Machine Vision* and explain its role in interactive deep learning applications with examples.

   (b) Describe the workflow of a *Natural Language Processing (NLP)* system using deep learning. What are the key components involved?

5. **(a)** List and briefly describe the major types of *deep reinforcement learning* algorithms. How does it differ from traditional reinforcement learning?

   (b) Explain the concept of an agent–environment interaction in Deep Reinforcement Learning with a suitable example.

6. **(a)** Describe the working of a Boltzmann Machine. How is energy minimized during training?

   (b) Define Restricted Boltzmann Machines (RBMs). What are their advantages over standard Boltzmann Machines?