**Deep Learning**

**Question Bank**

**UNIT I**

1. Write the differences between machine learning and deep learning
2. Write the application of deep learning in detail.
3. Explain the basic concept of perceptron with an example.
4. Discuss perceptron learning algorithm.
5. Investigate weight and bias of AND perceptron.
6. Investigate weight and bias of OR perceptron.
7. Investigate weight and bias of NOR perceptron.
8. Discuss how XOR is implemented using Multi-layer perceptron.
9. Write a program to generate following logic functions using McCulloch-Pitts neuron and appropriate values for weights, bias, and threshold. a. AND logic function b. OR logic function c. NOT logic function d. NOR logic function e. XOR logic function
10. Examine various activation functions used in neural Network.
11. Analyze the selection of activation functions for Output layer in NN.
12. Discuss computation steps for output of Multi-layer perceptron.
13. Investigate the importance of weight and bias in Neural network.
14. Explain Feed forward neural network with a neat diagram
15. Explain back propagation neural network with a neat diagram
16. Explain in detail any four practical issues in neural network training
17. Calculate the output of the following neuron Y with the activation function

as a) binary sigmoid b) tanh c)ReLU



18.Initiazing the weights of a neural network with very small or large random values is not advisable.Why?

**UNIT II**

1. Illustrate the gradient descent concept used in Feed Forward Neural Network.
2. Write Gradient descent algorithm steps and give its mathematical representation.
3. Illustrate vanishing gradient problem and its prevention.
4. Illustrate the RelU Heuristics for Avoiding Bad Local Minima.
5. Illustrate the heuristics for Faster Training
6. Illustrate the use of stochastic gradient descent.
7. What is dying Relu problem? Write and explain the different techniques for solving it.
8. Discuss the use of L1 and L2 regularization techniques in deep learning.
9. List and explain various regularization techniques available in deep learning.
10. What is drop out? How it avoids overfitting in Neural Network.
11. Explain the working of batch normalization in detail.
12. Demonstrate the working of Nesterov Accelerated Gradient.
13. Implement classifier model for CIFAR-10 dataset or MNIST dataset using KNN
14. Implement classifier modelforCIFAR-10 dataset or MNIST dataset using 3-layer neural network
15. Write a python code to study the effect of batch normalization and dropout in neural network classifier
16. Differentiate gradient descent with and without momentum. Give equations for weight updation in GD with and without momentum.
17. Explain the significance of loss function in backpropagation.

**UNIT III**

1. What is CNN? Discuss various layers of CNN in detail.
2. Demonstrate how pooling layer reduces the dimension of feature map.
3. Explain the working of Convolution layer in CNN architecture.
4. Discuss the importance of kernel filters in CNN.
5. What are the types of pooling layer? Discuss its importance.
6. Explain the Approach to Transfer Learning in convolutional neural network in detail.
7. Explain the steps involved in transfer learning
8. Examine the use of transfer learning in CNN.
9. Illustrate the use of transfer learning in image classification
10. Discuss in detail VGG-16 model for image classification.
11. Write a python code for image classification using CNN.
12. Write a code to implement transfer learning with python.
13. Discuss padding and striding operation in Convolution layer.
14. Explain the need for padding.Also discuss different types of padding in CNN.
15. Explain a CNN sequence to recognize handwritten digits.Assume a 5x5 kernel that uses valid padding.
16. How pooling handles inputs of varying size?Justify your answer with an example.
17. \*The output layer of convolutional network is usually relatively inexpensive to learning layer. Justify\*.
18. Write a code snippet in python that demonstrates convolution with a stride.
19. Explain feature map.
20. List and explain three stages of a convolutional network.
21. Give example for convolution.
22. Write short notes Max Pooling. . Explain Pooling with down sampling.
23. Construct a convolutional network to demonstrate the effect of zero padding and valid padding on a network.
24. Consider an activation volume of size 13×13×64 and a filter of size 3×3×64.Discuss whether it is possible to perform convolutions with strides 2, 3 and 5. Justify your answer in each case.

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**Unit IV**

1. Explain the architecture of Adversarial Generative network
2. Differentiate Convolutional neural networks and Generative adversarial networks.
3. What do you mean by Auto encoders? Explain.
4. Explain LSTM in detail
5. List the different gates of LSTM and describe its working
6. Recognize the purpose of Reset gate and Update gate in GRU
7. Discuss in detail the significance of denoising autoencoder with suitable diagram
8. Explain sparse auto encoders in detail
9. Explain Encoder Decoder architecture in detail
10. Explain a)Sparse Autoencoder b)Contractive auto encoder c) Variational Autoencoder
11. What is an encoder. List and explain the applications of encoders
12. What is Recurrent Neural Networks?
13. Give the advantage of recursive nets over recurrent nets.
14. Develop a block diagram for LSTM
15. Predict the concept of gated RNNs.
16. Illustrate block diagram of LSTM recurrent network “cell”.
17. Explain challenge of Long-Term Dependencies.(6)
18. Illustrate Encoder-Decoder sequence-to-sequence Architecture.
19. Describe the following. i. Long Short-Term Memory. ii. GRU.
20. List down three differences between LSTM and RNN.
21. Explain restricted Boltzmann Machine
22. What is Denoising Autoencoders?
23. Write short notes Sparse Autoencoders. ii. Illustrate Denoising Autoencoders.
24. Explain in brief sparse auto-encoders and contractive autoencoders

**Unit V**

1. What is image segmentation? Explain region-based image segmentation.
2. Define segmentation. Explain edge detection segmentation.
3. Investigate the working of Discriminator and Generator for generation of images
4. Explain Automatic Image Captioning with suitable example
5. Explain YOLO model object detection in detail
6. Write a python code snippet of LSTM model for text classification
7. Explain attention mechanism in computer vision
8. What do you mean by image captioning? Discuss any deep learning model for image captioning.
9. Write a python code for text classification with Vanilla RNNs.
10. Write a python code for text classification with LSTMs
11. Use Python programming language to solve segmentation problem using UNet.
12. Explain the architecture of U-Net.