**Question Bank**

**Neural Network and Deep Learning**

**Semester: 6th Sem Faculty in-charge: Disha D N**

**Module 1**

1. Define perceptron and explain its working
2. Describe any 5 activation functions used in neural network
3. With a neat diagram, explain the forward propagation process in ANN
4. Illustrate with an example, back propagation algorithm
5. Derive the chain rule for ANN, using minimum two hidden layers
6. Discuss different hyper parameters present in neural network
7. Differentiate among sigmoid and tanh activation function with an example
8. Explain dead ReLU problem. How it can be solved using Leaky ReLU activation function
9. Discuss vanishing gradient problem with an example using weight update formula
10. What is exploding gradient problem, discuss with an example
11. Explain different approaches to overcome exploding gradient problem
12. Explain different weight initialization techniques used in artificial neural networks
13. With an example, explain the concept of Batch normalization
14. Differentiate among vanishing gradient, exploding gradient and dead ReLU problems
15. With an example, explain gradient clipping, state how it can prevent exploding gradient problem
16. Explain gradient descent optimization technique with an example
17. Explain stochastic gradient descent with an example, explain with Loss/Cost formula
18. Explain mini-batch stochastic gradient descent problem, state the advantage and disadvantage of it
19. Explain mini-batch stochastic gradient with momentum, derive the weight updation formula with gradient curve
20. Explain AdaGrade Optimizers and derive the weight updation formula
21. Explain RMS PROP optimization technique, state the advantages of it
22. Explain ADAM optimization technique with example, derive the weight updation formula
23. Define overfitting, explain how it can be reduced in ANN
24. Differentiate among L1, L2 regularization techniques
25. Explain Drop-out layers with an example

**Module 2**

1. Differentiate among Artificial Neural network and Convolutional neural network
2. Explain the working of CNN
3. Explain different layers of CNN with an example
4. Explain how convolution works, explain with example
5. Explain the need of padding in convolution process
6. Explain strides and discuss its disadvantage with an example
7. Explain the pooling layer in CNN
8. Explain the padding process by considering 5\*5 image input for the filter size of 3\*3 horizontal and vertical edge detection and explain the feature map formula, with padding
9. Explain max pooling operation in CNN
10. Explain back propagation algorithm by considering CNN
11. Discuss the need of data augmentation and explain the methods of it
12. Discuss different convolution operations in CNN
13. Explain different architectures of convolutional neural network
14. Explain the need of RNN, differentiate between artificial neural network and recurrent neural network
15. Explain forward propagation in Recurrent neural network
16. Explain back propagation in Recurrent neural network
17. Discuss the types of Recurrent neural networks
18. Discuss the problems of recurrent neural networks
19. Explain bidirectional RNN with example
20. Explain encoder and decoder used in neural network
21. Discuss the problems with encoder and decoder circuit
22. Explain LSTM recurrent neural network
23. Explain different techniques used in learning long term dependencies in RNN

**Module 3**

1. Explain different performance metrics supported for neural networks
2. Discuss different baseline models present in neural network and deep learning
3. Discuss how to identify, whether to gather more data in deep learning
4. Explain large scale deep learning and its applications
5. Discuss how to identify, whether to gather more data in deep learning
6. Discuss the process of how deep learning can be applied in computer vision
7. Discuss the process of how deep learning can be applied in natural language processing