Neural Networks MCQ Quiz (Chapter 2)

Instructions: Select the best answer for each question.

1. What is the primary function of a neural network?

a) Store data permanently

b) Learn patterns and make predictions

c) Replace human brain functions entirely

d) Perform arithmetic calculations only

2. Which component of a neural network mimics the human brain's neurons?

a) Weights

b) Artificial neurons (nodes)

c) Activation functions

d) Input layers

3. What is the role of "weights" in a neural network?

a) Store raw data

b) Adjust the importance of input signals

c) Activate the output layer

d) Visualize data

4. Which layer in a neural network receives raw input data?

a) Input layer

b) Hidden layer

c) Output layer

d) Bias layer

5. Why are activation functions used in neural networks?

a) To increase linearity

b) To introduce non-linearity

c) To reduce computational power

d) To delete irrelevant data

6. Which activation function is most commonly used in hidden layers?

a) Sigmoid

b) ReLU (Rectified Linear Unit)

c) Tanh

d) Softmax

7. What is the output range of the sigmoid function?

a) -1 to 1

b) 0 to 1

c) -∞ to ∞

d) 0 to 100

8. Which activation function is ideal for multi-class classification?

a) ReLU

b) Tanh

c) Softmax

d) Sigmoid

9. What problem does ReLU help mitigate in deep networks?

a) Overfitting

b) Vanishing gradients

c) Slow computation

d) Data sparsity

10. Which type of neural network is best for image processing?

a) RNN

b) CNN (Convolutional Neural Network)

c) FNN

d) GAN

11. What is the key feature of Convolutional Neural Networks (CNNs)?

a) Processing sequential data

b) Detecting spatial hierarchies (e.g., edges, shapes)

c) Generating random outputs

d) Using only linear activation functions

12. Which neural network type is designed for sequential data (e.g., time series)?

a) CNN

b) RNN (Recurrent Neural Network)

c) Perceptron

d) Autoencoder

13. What is the main challenge of standard RNNs?

a) High computational cost

b) Vanishing gradient problem

c) Inability to process images

d) Lack of hidden layers

14. Which advanced RNN variant addresses long-term dependency issues?

a) Perceptron

b) LSTM (Long Short-Term Memory)

c) Softmax

d) ReLU

15. What are the two components of a GAN (Generative Adversarial Network)?

a) Encoder and Decoder

b) Generator and Discriminator

c) Input and Output layers

d) Weights and Biases

16. What is the purpose of the "Generator" in a GAN?

a) Classify data

b) Create synthetic data mimicking real data

c) Optimize weights

d) Activate neurons

17. Which neural network is the simplest and has no cycles?

a) Feedforward Neural Network (FNN)

b) CNN

c) RNN

d) GAN

18. What is the primary function of the "output layer"?

a) Store raw data

b) Produce final predictions/classifications

c) Initialize weights

d) Normalize inputs

19. Which activation function outputs zero-centered values (-1 to 1)?

a) Sigmoid

b) Tanh

c) ReLU

d) Softmax

20. What is a "perceptron"?

a) A type of CNN

b) The simplest neural network unit (binary classifier)

c) An advanced RNN

d) A loss function

21. Which technique adjusts weights during neural network training?

a) Feature extraction

b) Backpropagation

c) Pooling

d) Convolution

22. What does "deep" in deep learning refer to?

a) Large datasets

b) Multiple hidden layers

c) High accuracy

d) Complex activation functions

23. Which neural network is used for unsupervised learning (e.g., dimensionality reduction)?

a) CNN

b) RNN

c) Autoencoder

d) Perceptron

24. What is the main advantage of Tanh over Sigmoid?

a) Faster computation

b) Zero-centered outputs (faster convergence)

c) Binary classification

d) No vanishing gradients

25. Which neural network type is used for tasks like machine translation and chatbots?

a) CNN

b) RNN/LSTM

c) FNN

d) GAN