1. What is the difference between a neuron and a neural network?
2. Can you explain the structure and components of a neuron?
3. Describe the architecture and functioning of a perceptron.
4. What is the main difference between a perceptron and a multilayer perceptron?
5. Explain the concept of forward propagation in a neural network.
6. What is backpropagation, and why is it important in neural network training?
7. How does the chain rule relate to backpropagation in neural networks?
8. What are loss functions, and what role do they play in neural networks?
9. Can you give examples of different types of loss functions used in neural networks?
10. Discuss the purpose and functioning of optimizers in neural networks.
11. What is the exploding gradient problem, and how can it be mitigated?
12. Explain the concept of the vanishing gradient problem and its impact on neural network training.
13. How does regularization help in preventing overfitting in neural networks?
14. Describe the concept of normalization in the context of neural networks.
15. What are the commonly used activation functions in neural networks?
16. Explain the concept of batch normalization and its advantages.
17. Discuss the concept of weight initialization in neural networks and its importance.
18. Can you explain the role of momentum in optimization algorithms for neural networks?
19. What is the difference between L1 and L2 regularization in neural networks?
20. How can early stopping be used as a regularization technique in neural networks?
21. Describe the concept and application of dropout regularization in neural networks.
22. Explain the importance of learning rate in training neural networks.
23. What are the challenges associated with training deep neural networks?
24. How does a convolutional neural network (CNN) differ from a regular neural network?
25. Can you explain the purpose and functioning of pooling layers in CNNs?
26. What is a recurrent neural network (RNN), and what are its applications?
27. Describe the concept and benefits of long short-term memory (LSTM) networks.
28. What are generative adversarial networks (GANs), and how do they work?
29. Can you explain the purpose and functioning of autoencoder neural networks?
30. Discuss the concept and applications of self-organizing maps (SOMs) in neural networks.
31. How can neural networks be used for regression tasks?
32. What are the challenges in training neural networks with large datasets?
33. Explain the concept of transfer learning in neural networks and its benefits.
34. How can neural networks be used for anomaly detection tasks?
35. Discuss the concept of model interpretability in neural networks.
36. What are the advantages and disadvantages of deep learning compared to traditional machine learning algorithms?
37. Can you explain the concept of ensemble learning in the context of neural networks?
38. How can neural networks be used for natural language processing (NLP) tasks?
39. Discuss the concept and applications of self-supervised learning in neural networks.
40. What are the challenges in training neural networks with imbalanced datasets?
41. Explain the concept of adversarial attacks on neural networks and methods to mitigate them.

42. Can you discuss the trade-off between model complexity and generalization performance in neural networks?

43. What are some techniques for handling missing data in neural networks?

44. Explain the concept and benefits of interpretability techniques like SHAP values and LIME in neural networks.

45. How can neural networks be deployed on edge devices for real-time inference?

46. Discuss the considerations and challenges in scaling neural network training on distributed systems.

47. What are the ethical implications of using neural networks in decision-making systems?

48. Can you explain the concept and applications of reinforcement learning in neural networks?

49. Discuss the impact

of batch size in training neural networks.

50. What are the current limitations of neural networks and areas for future research?