50 Questions on Advanced Computer Networks (ACN)

1. What is the function of the transport layer in the OSI model?

2. Define Quality of Service (QoS) in computer networks.

3. What is the role of DNS in networking?

4. Define congestion control.

5. What is BGP used for?

6. List the types of routing algorithms.

7. What is the difference between TCP and UDP?

8. Define packet switching and circuit switching.

9. What is NAT in networking?

10. Name any four application layer protocols.

11. Explain the working of the three-way TCP handshake.

12. How does ARP work in a local network?

13. Describe the sliding window protocol with an example.

14. What is the function of the data link layer?

15. Explain subnetting with an example.

16. Describe the difference between IPv4 and IPv6.

17. How does DNS resolve domain names?

18. Explain the concept of encapsulation in networking.

19. Describe the use of sockets in networking.

20. What are the main differences between OSI and TCP/IP models?

21. Apply subnetting to divide a network into four subnets.

22. Demonstrate how to calculate the checksum in TCP.

23. Show how a router determines the next hop using a routing table.

24. Given an IP address, determine its class and default subnet mask.

25. Use Wireshark to capture packets and identify protocol headers.

26. Implement a basic client-server model using socket programming.
27. Apply NAT in a small office network setup.
28. Configure a firewall using access control lists (ACLs).
29. Simulate distance vector routing using a network simulator.
30. Develop a script to automate IP address allocation using DHCP.
31. Analyze the causes of congestion in a network.
32. Compare and contrast distance vector and link-state routing.
33. Examine the structure of TCP and UDP headers.
34. Break down the process of DNS name resolution.
35. Distinguish between connection-oriented and connectionless protocols.
36. Analyze packet loss using network performance tools.
37. Compare packet switching and message switching techniques.
38. Identify potential security vulnerabilities in a TCP/IP network.
39. Differentiate between interior and exterior routing protocols.
40. Analyze the impact of jitter and delay on VoIP quality.
41. Evaluate the performance of TCP over a lossy network.
42. Critically assess the effectiveness of QoS mechanisms.
43. Judge the security of a network using vulnerability assessment tools.
44. Compare different congestion control algorithms.
45. Evaluate the pros and cons of MPLS over traditional routing.
46. Assess the impact of protocol overhead in large networks.
47. Compare centralized vs. distributed network architectures.
48. Judge the scalability of OSPF in a large enterprise network.
49. Evaluate cloud-based networking solutions for small businesses.
50. Assess the performance of VPN tunneling protocols.
51. Design a scalable IP addressing scheme for a university.

52. Create a secure network architecture for a small business.

53. Develop a network simulation to demonstrate BGP routing.

54. Propose a solution to optimize bandwidth usage in a campus network.

55. Build a basic IDS using Snort to monitor network traffic.

56. Create a script to automate network performance monitoring.

57. Design a load balancing mechanism using open-source tools.

58. Propose an improvement to the TCP congestion control algorithm.

59. Develop a policy for enterprise network security.

60. Create a project report on implementing IPv6 in an IPv4 network.