1- Which network device operates at the Data Link Layer (Layer 2) of the OSI model and helps in filtering and forwarding frames based on MAC addresses?
a) Hub
b) Router
c) Switch
d) Firewall

2- Which network device is used to connect multiple network segments and operate at the Network Layer and responsible for making forwarding decisions based on IP addresses?
a) Hub
b) Router
c) Switch
d) Bridge

3- What is the primary function of a hub in a network?
a) Filtering traffic based on MAC addresses
b) Forwarding data between different network segments
c) Providing wireless connectivity
d) Broadcasting incoming data to all connected devices

4- Which network device connects devices within the same local area network (LAN) of the OSI model?
a) Router
b) Switch
c) Bridge
d) Gateway

5- What is the main function of a modem in a network?
a) To connect devices within a LAN
b) To provide wireless connectivity
c) To convert digital data to analog signals for transmission over telephone lines
d) To filter and manage network traffic

6- Which network device is used to protect a network by monitoring incoming and outgoing traffic and blocking or allowing it based on security policies?
a) Router
b) Hub
c) Firewall
d) Modem

7- What is the purpose of a network repeater?
a) To connect multiple network segments
b) To manage and control network traffic
c) To amplify and extend network signals
d) To provide security for network resources

8- What is the primary purpose of a network bridge?
a) To connect devices within the same network segment
b) To connect different network segments
c) To connect devices to the internet
d) To provide wireless connectivity

9- What does a bridge do to filter network traffic?
a) It filters traffic based on IP addresses
b) It filters traffic based on application protocols
c) It filters traffic based on domain names
d) It filters traffic based on MAC addresses

10- How does a bridge differ from a switch?
a) Bridges operate at a higher OSI layer than switches
b) Bridges connect different network segments, while switches connect devices within the same segment
c) Bridges forward traffic based on IP addresses, while switches forward traffic based on MAC addresses
d) Bridges provide wireless connectivity, while switches do not

11- What is the primary function of a network repeater?
a) To connect devices within the same network segment
b) To connect different network segments and forward traffic based on MAC addresses
c) To amplify and extend network signals
d) To filter and control network traffic

12- Where is a network repeater typically placed in a network topology?
a) At the center of the network
b) At the edge of the network
c) Between two network segments
d) Next to the router

13- Which OSI model layer does a network repeater operate at?
a) Data Link Layer
b) Network Layer
c) Physical Layer
d) Transport Layer

14- What type of signal does a network repeater amplify and regenerate?
a) Analog signal
b) Digital signal
c) both a and b
d) Compressed signal

15- What is a common drawback of using network repeaters?
a) They increase network security risks
b) They consume a significant amount of power
c) They can introduce noise and interference to the signal
d) They require constant manual configuration

16- What is the primary function of a gateway in a computer network?
A) Providing power to network devices
B) Transmitting data between devices on the same network
C) Connecting different types of networks
D) Amplifying network signals

17- Which of the following is an example of a protocol that a gateway might translate between in a network?
A) HTTP and FTP
B) IPv4 and IPv6
C) TCP and UDP
D) SMTP and POP3

18- In circuit switching, what happens during the setup phase of communication?
A) Data packets are transmitted
B) A dedicated circuit is established between the sender and receiver
C) Data is transmitted over multiple paths
D) Data is divided into smaller units

19- Which of the following statements about circuit switching is true?
A) It is commonly used in packet-switched networks
B) It is more efficient for short, sporadic conversations
C) It dynamically allocates resources based on demand
D) It guarantees a constant transmission rate

20- What is the primary advantage of packet switching over circuit switching?
A) Lower latency
B) Guaranteed quality of service
C) More efficient use of network resources
D) Consistent transmission rate

21- In packet switching, how are data packets transmitted from the source to the destination?
A) Along a dedicated communication path
B) By establishing a virtual circuit
C) Through multiple switches and routers
D) By using a fixed frequency channel

22- Which of the following transmission methods is typically faster for transferring large amounts of data?
A) Serial transmission
B) Parallel transmission
C) Both have the same speed
D) It depends on the specific system

23- Which of the following statements is true regarding the number of transmission lines required for serial and parallel transmission?
A) Parallel transmission requires fewer lines than serial transmission
B) Serial transmission requires fewer lines than parallel transmission
C) Both methods require the same number of lines
D) The number of lines depends on the speed of transmission

24- Which type of topology is commonly used in Wide Area Networks (WANs)?
A) Bus topology
B) Star topology
C) Tree topology
D) Ring topology

25- Which topology offers simple network management and easy addition or removal of devices, making it suitable for organizations that frequently change their network layout?
A) Bus topology
B) Star topology
C) Ring topology
D) Mesh topology

26- What is the primary function of the Domain Name System (DNS)?
A) To assign IP addresses to devices on a network
B) To translate domain names to IP addresses
C) To route data packets across the internet
D) To secure communication between devices

27- What is the purpose of a subnet mask in networking?
A) To identify the network portion of an IP address
B) To determine the class of an IP address
C) To provide encryption for data transmission
D) None of the above

28- What does the subnet notation "/24" represent in IP addressing?
A) A subnet mask of 24 bits
B) A subnet mask of 255.255.255.0
C) A network address with 24 subnets
D) A broadcast address with 24 subnets

29- If an IP address is given as 10.0.0.50/28, how many host addresses are available in this subnet?

A) 14

B) 16

C) 30

D) 32