

Member ID: \_\_\_\_\_

Time: \_\_\_\_\_

Rank: \_\_\_\_\_



# Computer Network Technology (300)

## Regional 2024

### CONCEPT KNOWLEDGE:

Multiple Choice (50 @ 2 points each) \_\_\_\_\_ (100 points)

**Test Time: 60 minutes**



**GENERAL GUIDELINES:**

*Failure to adhere to any of the following rules will result in disqualification:*

1. Member must hand in this test booklet and all printouts if any. Failure to do so will result in disqualification.
2. No equipment, supplies, or materials other than those specified for this event are allowed in the testing area. No previous BPA tests and/or sample tests (handwritten, photocopied, or keyed) are allowed in the testing area.
3. Electronic devices will be monitored according to ACT standards.

### Multiple Choice Questions

*Directions:* Identify the letter of the choice that best completes the statement or answers the question.

1. What is the default subnet mask for a Class C network?  
A. 255.0.0.0  
B. 255.255.0.0  
C. 255.255.255.0  
D. 255.255.255.255
2. Which IP address belongs to the loopback address range?  
A. 127.0.0.1  
B. 192.168.0.1  
C. 10.0.0.1  
D. 172.16.0.1
3. Which IP address is a private address within the Class B range?  
A. 192.0.2.1  
B. 172.16.0.1  
C. 10.0.0.1  
D. 169.254.0.1
4. What is the maximum number of hosts that can be assigned to each subnet using a subnet mask of 255.255.255.192?  
A. 62  
B. 30  
C. 126  
D. 254
5. What port does HTTP use?  
A. 22  
B. 443  
C. 80  
D. 23
6. What is the purpose of the OSI model's Transport layer?  
A. To establish, maintain and terminate connections between applications  
B. To provide routing and forwarding services  
C. To translate data into binary format  
D. To provide error-free transmission over the network
7. The TCP/IP protocol corresponds to which layer(s) in the OSI model?  
A. Layer 1 and 2  
B. Layer 2 and 3  
C. Layer 3 and 4  
D. Layer 4 and 5

8. The Internet Protocol (IP) is associated with which layer of the OSI model?
  - A. Layer 1 Physical
  - B. Layer 2 Data Link
  - C. Layer 3 Network
  - D. Layer 4 Transport
9. Which layer of the OSI model deals with the mechanical and electrical specifications of the interface and transmission medium?
  - A. Layer 1 Physical
  - B. Layer 2 Data Link
  - C. Layer 3 Network
  - D. Layer 4 Transport
10. Where does the function of logical addressing typically take place in the OSI model?
  - A. Layer 1 Physical
  - B. Layer 2 Data Link
  - C. Layer 3 Network
  - D. Layer 4 Transport
11. Which OSI layer packages raw bits into frames?
  - A. Layer 1 Physical
  - B. Layer 2 Data Link
  - C. Layer 3 Network
  - D. Layer 4 Transport
12. Which layer of the OSI model would you associate with routers?
  - A. Layer 1 Physical
  - B. Layer 2 Data Link
  - C. Layer 3 Network
  - D. Layer 4 Transport
13. What command is used to check the connectivity between two networked devices?
  - A. traceroute
  - B. ping
  - C. netstat
  - D. telnet
14. Which command is used to display the MAC (Media Access Control) address of a network interface on a Windows computer?
  - A. macaddress
  - B. getmac
  - C. ifconfig
  - D. macconfig

15. What command is used to display the network interfaces on a Windows system?
  - A. ifinfo
  - B. netstat
  - C. ipconfig
  - D. showinterfaces
16. Which network architecture uses a central 'hub' to connect all devices in a network?
  - A. Ring
  - B. Mesh
  - C. Star
  - D. Bus
17. What is the maximum data rate supported by the IEEE 802.11n Wi-Fi standard?
  - A. 11 Mbps
  - B. 54 Mbps
  - C. 600 Mbps
  - D. 1 Gbps
18. Which Wi-Fi security protocol is considered the most secure as of 2022?
  - A. WEP
  - B. WPA
  - C. WPA2
  - D. WPA3
19. Which wireless technology is primarily designed for short-range communication between devices like smartphones and headphones?
  - A. Wi-Fi
  - B. Bluetooth
  - C. NFC
  - D. RFID
20. Which network topology is designed such that each node is connected to every other node?
  - A. Star
  - B. Mesh
  - C. Ring
  - D. Bus
21. In what network topology is a central hub failure catastrophic?
  - A. Ring
  - B. Mesh
  - C. Bus
  - D. Star

22. Which network topology requires the most cable length, thus making it potentially the most expensive to implement?
- A. Mesh
  - B. Ring
  - C. Bus
  - D. Star
23. What is the maximum number of hosts in a subnet with the mask /28?
- A. 14
  - B. 16
  - C. 254
  - D. 256
24. What is the subnet mask for a /18 prefix?
- A. 255.255.192.0
  - B. 255.255.0.0
  - C. 255.255.255.0
  - D. 255.255.128.0
25. What is the last IP address of the subnet 192.168.1.0/24?
- A. 192.168.1.255
  - B. 192.168.1.254
  - C. 192.168.1.0
  - D. 192.168.2.0
26. What is the primary purpose of a VPN (Virtual Private Network)?
- A. Filtering email spam
  - B. Hosting websites
  - C. Encrypting and securing data transmission over public networks
  - D. Speeding up internet connection
27. In a VPN, what does the term "tunneling" refer to?
- A. The method of bypassing network security
  - B. The process of encapsulating a packet inside another packet before it's transmitted over the internet
  - C. The ability to connect to a network from a great distance
  - D. The process of hiding a user's location
28. What is the primary benefit of using VLANs?
- A. Increased storage capacity
  - B. Improved network performance and security
  - C. Lower cost of network hardware
  - D. All of the above

29. Which device is responsible for routing data packets between different networks?
- A. Switch
  - B. Router
  - C. Modem
  - D. Hub
30. What role does a modem play in a typical home network?
- A. Acts as a switch
  - B. Routes traffic between networks
  - C. Translates between digital signals from your local network and analog signals from your Internet Service Provider (ISP)
  - D. Provides firewall functionality
31. Which of the following devices typically provides Wi-Fi capability in a home network?
- A. Modem
  - B. Switch
  - C. Router
  - D. Network card
32. What does the abbreviation DNS stand for in the context of computer networking?
- A. Dynamic Network System
  - B. Domain Name System
  - C. Distributed Network Service
  - D. Digital Networking System
33. Which of the following is NOT a type of DNS record?
- A. AAAA record
  - B. CNAME record
  - C. NS record
  - D. Z record
34. What type of attack involves overloading a DNS server with requests, preventing it from responding to legitimate queries?
- A. Man-in-the-middle attack
  - B. DNS Amplification attack
  - C. SQL Injection attack
  - D. Cross-Site Scripting attack
35. What does the term "DNS resolution" refer to?
- A. The process of updating DNS records
  - B. The process of finding an IP address from a domain name
  - C. The process of setting up a DNS server
  - D. The process of troubleshooting DNS issues



36. Which DNS record type is used to map hostnames to an IP address?
- A. MX
  - B. CNAME
  - C. A
  - D. TXT
37. What is the primary purpose of DHCP?
- A. Assigning IP addresses to devices on a network
  - B. Resolving domain names to IP addresses
  - C. Providing security for network communication
  - D. Managing network switches and routers
38. Which statement accurately describes the relationship between DHCP and WINS?
- A. DHCP relies on WINS for IP address assignment.
  - B. WINS relies on DHCP for name resolution.
  - C. DHCP and WINS are separate and independent protocols.
  - D. DHCP and WINS perform the same function but are used interchangeably.
39. What happens when a DHCP lease expires?
- A. The client device retains the IP address indefinitely.
  - B. The DHCP server automatically renews the lease for the client device.
  - C. The IP address is released and becomes available for other devices to use.
  - D. The client device is disconnected from the network until a new lease is obtained.
40. Which tool is commonly used to analyze network traffic and identify packet-level issues?
- A. Wireshark
  - B. Ping
  - C. Traceroute
  - D. Nmap
41. Which tool is used to monitor network devices, collect performance data, and generate alerts?
- A. Ping
  - B. SNMP
  - C. ipconfig
  - D. NetStumbler
42. Which remote access tool allows for accessing files on a remote server using a client-server architecture?
- A. FTP (File Transfer Protocol)
  - B. SMTP (Simple Mail Transfer Protocol)
  - C. POP3 (Post Office Protocol 3)
  - D. SNMP (Simple Network Management Protocol)

43. Which remote access protocol allows for remote access to web-based applications and services?
- A. HTTP (Hypertext Transfer Protocol)
  - B. ICMP (Internet Control Message Protocol)
  - C. DNS (Domain Name System)
  - D. DHCP (Dynamic Host Configuration Protocol)
44. Which remote access tool is used for remotely managing and controlling network devices through a command-line interface?
- A. Telnet
  - B. SSH (Secure Shell)
  - C. RDP (Remote Desktop Protocol)
  - D. VPN (Virtual Private Network)
45. Which client operating system is most commonly used in enterprise environments?
- A. Windows 7
  - B. Linux Mint
  - C. Chrome OS
  - D. Windows 10 Pro
46. Which network operating system is designed specifically for managing and controlling network devices?
- A. Ubuntu Server
  - B. Cisco IOS
  - C. macOS Server
  - D. Fedora Workstation
47. Which network operating system is commonly used in small office/home office (SOHO) environments?
- A. macOS Server
  - B. Windows Server
  - C. Ubuntu Server
  - D. Windows 10 Home
48. Directory services are primarily used for:
- A. Managing network switches
  - B. Authenticating users
  - C. Storing web page content
  - D. Monitoring network traffic
49. Which of the following is true about IPv4?
- A. It uses a 32-bit address format
  - B. It uses a 128-bit address format
  - C. It supports more address space than IPv6
  - D. It does not require NAT (Network Address Translation)

50. How are IPv4 and IPv6 addresses represented differently?
- A. IPv4 addresses are written in binary, while IPv6 addresses are written in hexadecimal.
  - B. IPv4 addresses use a colon as a separator, while IPv6 addresses use a period.
  - C. IPv4 addresses are longer than IPv6 addresses.
  - D. IPv4 addresses use a subnet mask, while IPv6 addresses use a default gateway.