Here are the 100 MCQs based on the text:

**1. Which organization developed the OSI model?**

a) Department of Defense (DoD) b) Internet Engineering Task Force (IETF) c) International Organization for Standardization (ISO) d) Institute of Electrical and Electronics Engineers (IEEE)

**Correct Answer: c) International Organization for Standardization (ISO)**

**2. How many layers are in the OSI model?**

a) 4 b) 5 c) 6 d) 7

**Correct Answer: d) 7**

**3. Which layer is the bottom layer in the OSI model?**

a) Application Layer b) Physical Layer c) Network Layer d) Transport Layer

**Correct Answer: b) Physical Layer**

**4. Which layer is layer 7 in the OSI model?**

a) Application Layer b) Physical Layer c) Network Layer d) Transport Layer

**Correct Answer: a) Application Layer**

**5. Which of the following is an example of a physical layer medium?**

a) TCP b) IP c) Ethernet cable d) HTTP

**Correct Answer: c) Ethernet cable**

**6. Which layer is responsible for data transfer between nodes on the same network segment?**

a) Physical Layer b) Data Link Layer c) Network Layer d) Transport Layer

**Correct Answer: b) Data Link Layer**

**7. What is the protocol used in the Data Link Layer for wired networks?**

a) WiFi b) Ethernet c) TCP d) UDP

**Correct Answer: b) Ethernet**

**8. What does MAC stand for?**

a) Media Access Control b) Main Application Code c) Maximum Application Capacity d) Memory Allocation Chip

**Correct Answer: a) Media Access Control**

**9. How many bytes is a MAC address?**

a) 4 b) 6 c) 8 d) 10

**Correct Answer: b) 6**

**10. In a MAC address, what do the three leftmost bytes identify?**

a) Destination host

b) Source host

c) Vendor

d) Network segment

\*\*Correct Answer: c) Vendor\*\*

**11. Which model was developed by the Department of Defense (DoD)?**

a) OSI model

b) TCP/IP model

c) ISO model

d) IEEE model

\*\*Correct Answer: b) TCP/IP model\*\*

**12. In the TCP/IP model, which layers are grouped into the Application Layer?**

a) Physical, Data Link, Network

b) Transport, Session, Presentation

c) Application, Presentation, Session

d) Network, Transport, Application

\*\*Correct Answer: c) Application, Presentation, Session\*\*

**13. What is layer 3 called in the TCP/IP model?**

a) Transport Layer

b) Internet Layer

c) Link Layer

d) Physical Layer

\*\*Correct Answer: b) Internet Layer\*\*

**14. Which of the following protocols belongs to the Application Layer of the TCP/IP model?**

a) TCP

b) UDP

c) IP

d) HTTP

\*\*Correct Answer: d) HTTP\*\*

**15. Which of the following protocols belongs to the Transport Layer?**

a) HTTP

b) IP

c) TCP

d) Ethernet

\*\*Correct Answer: c) TCP\*\*

**16. How many octets are in an IPv4 address?**

a) 2

b) 4

c) 6

d) 8

\*\*Correct Answer: b) 4\*\*

**17. What is the range of decimal numbers that each octet in an IPv4 address can represent?**

a) 0-127

b) 0-255

c) 1-256

d) 1-65535

\*\*Correct Answer: b) 0-255\*\*

**18. What is the maximum number of unique IPv4 addresses (approximately)?**

a) 2 billion

b) 4 billion

c) 8 billion

d) 16 billion

\*\*Correct Answer: b) 4 billion\*\*

**19. Which command is used to look up your IP address on a MS Windows command line?**

a) ifconfig

b) ip address show

c) ipconfig

d) ip a s

\*\*Correct Answer: c) ipconfig\*\*

**20. Which command is used to look up your IP address on Linux/UNIX-based systems?**

a) ipconfig

b) netstat

c) ipconfig /all

d) ifconfig

\*\*Correct Answer: d) ifconfig\*\*

**21. What does the output of "ip a s" show?**

a) MAC address only

b) IP address, subnet mask, and broadcast address

c) Only the subnet mask

d) Only the broadcast address

\*\*Correct Answer: b) IP address, subnet mask, and broadcast address\*\*

**22. What does "/24" mean in an IP address representation?**

a) The last 24 bits are the same across the network.

b) The first 24 bits are the same across the network.

c) The subnet mask is 24.

d) There are 24 hosts on the network.

\*\*Correct Answer: b) The first 24 bits are the same across the network.\*\*

**23. Which of the following is a private IP address range?**

a) 127.0.0.0 - 127.255.255.255

b) 192.168.0.0 - 192.168.255.255

c) 169.254.0.0 - 169.254.255.255

d) 224.0.0.0 - 239.255.255.255

\*\*Correct Answer: b) 192.168.0.0 - 192.168.255.255\*\*

**24. Which RFC defines private IP address ranges?**

a) RFC 791

b) RFC 1918

c) RFC 959

d) RFC 2616

\*\*Correct Answer: b) RFC 1918\*\*

**25. What is the purpose of Network Address Translation (NAT)?**

a) To assign private IP addresses.

b) To allow private IP addresses to access the Internet.

c) To filter network traffic.

d) To speed up network connections.

\*\*Correct Answer: b) To allow private IP addresses to access the Internet.\*\*

**26. What is the function of a router?**

a) To translate IP addresses.

b) To forward data packets to the proper network.

c) To connect devices on the same network segment.

d) To provide wireless connectivity.

\*\*Correct Answer: b) To forward data packets to the proper network.\*\*

**27. What layer does a router function at?**

a) Layer 2

b) Layer 3

c) Layer 4

d) Layer 7

\*\*Correct Answer: b) Layer 3\*\*

**28. Which of the following is NOT a private IP address range?**

a) 10.0.0.0 - 10.255.255.255

b) 172.16.0.0 - 172.31.255.255

c) 192.168.0.0 - 192.168.255.255

d) 192.169.0.0 - 192.169.255.255

\*\*Correct Answer: d) 192.169.0.0 - 192.169.255.255\*\*

**29. Which of the following is NOT a valid IP address?**

a) 192.168.1.1

b) 10.0.0.1

c) 172.16.256.1

d) 192.168.255.255

\*\*Correct Answer: c) 172.16.256.1\*\*

**30. Which protocol allows us to reach a specific process on a target host?**

a) IP

b) TCP

c) UDP

d) HTTP

\*\*Correct Answer: c) UDP\*\*

**31. Is UDP connection-oriented or connectionless?**

a) Connection-oriented

b) Connectionless

c) Both

d) Neither

\*\*Correct Answer: b) Connectionless\*\*

**32. What is the range of port numbers?**

a) 0-255

b) 1-1024

c) 0-65535

d) 1-65535

\*\*Correct Answer: d) 1-65535\*\*

**33. Which port number is reserved?**

a) 1

b) 0

c) 65535

d) 1024

\*\*Correct Answer: b) 0\*\*

**34. Which protocol guarantees delivery of packets?**

a) UDP

b) IP

c) TCP

d) HTTP

\*\*Correct Answer: c) TCP\*\*

**35. Is TCP connection-oriented or connectionless?**

a) Connection-oriented

b) Connectionless

c) Both

d) Neither

\*\*Correct Answer: a) Connection-oriented\*\*

**36. What is the purpose of the three-way handshake in TCP?**

a) To send data quickly.

b) To establish a connection.

c) To acknowledge received packets.

d) To determine the port number.

\*\*Correct Answer: b) To establish a connection.\*\*

**37. Which flags are used in the TCP three-way handshake?**

a) SYN and ACK

b) IP and MAC

c) HTTP and HTTPS

d) UDP and TCP

\*\*Correct Answer: a) SYN and ACK\*\*

**38. What does SYN stand for?**

a) Synchronize

b) System Network

c) Server Node

d) Session Number

\*\*Correct Answer: a) Synchronize\*\*

**39. What does ACK stand for?**

a) Access Control Key

b) Acknowledgment

c) Application Connection Key

d) Address Control Key

\*\*Correct Answer: b) Acknowledgment\*\*

**40. In which layer does encapsulation occur?**

a) Only the Application Layer

b) Only the Physical Layer

c) All Layers

d) Only the Transport Layer

\*\*Correct Answer: c) All Layers\*\*

**41. What is added to the data at each layer during encapsulation?**

a) Trailer only

b) Header only

c) Header and sometimes a trailer

d) Data only

\*\*Correct Answer: c) Header and sometimes a trailer\*\*

**42. What is the TCP data unit called?**

a) Datagram

b) Segment

c) Packet

d) Frame

\*\*Correct Answer: b) Segment\*\*

**43. What is the UDP data unit called?**

a) Segment

b) Packet

c) Frame

d) Datagram

\*\*Correct Answer: d) Datagram\*\*

**44. What is the network layer data unit called?**

a) Segment

b) Packet

c) Frame

d) Datagram

\*\*Correct Answer: b) Packet\*\*

**45. What is the data link layer data unit called?**

a) Segment

b) Packet

c) Frame

d) Datagram

\*\*Correct Answer: c) Frame\*\*

**46. In the life of a packet, what is the first step after the user enters the search query?**

a) The IP layer adds the source and destination IP addresses.

b) The TCP layer establishes a connection.

c) The web browser prepares an HTTP request.

d) The link layer adds the proper header and trailer.

\*\*Correct Answer: c) The web browser prepares an HTTP request.\*\*

**47. In the life of a packet, what happens after the TCP layer establishes a connection?**

a) The IP layer adds the source and destination IP addresses.

b) The link layer adds the proper header and trailer.

c) The router removes the link layer header and trailer.

d) The TCP layer sends the HTTP request.

\*\*Correct Answer: d) The TCP layer sends the HTTP request.\*\*

**48. In the life of a packet, what does the IP layer add to the packet?**

a) Link layer header and trailer

b) Source and destination MAC addresses

c) Source and destination IP addresses

d) TCP header

\*\*Correct Answer: c) Source and destination IP addresses\*\*

**49. What does the router do with the link layer header and trailer?**

a) Adds them

b) Removes them

c) Modifies them

d) Ignores them

\*\*Correct Answer: b) Removes them\*\*

**50. What is the protocol used for remote terminal connection?**

a) HTTP

b) FTP

c) TELNET

d) SSH

\*\*Correct Answer: c) TELNET\*\*

**51. What is the default port number for the echo server?**

a) 80

b) 13

c) 7

d) 21

\*\*Correct Answer: c) 7\*\*

**52. What is the default port number for the daytime server?**

a) 80

b) 13

c) 7

d) 21

\*\*Correct Answer: b) 13\*\*

**53. What is the default port number for the web (HTTP) server?**

a**) 80**

b) 13

c) 7

d) 21

\*\*Correct Answer: a) 80\*\*

**54. How do you close a Telnet connection?**

a) Ctrl + C

b) Ctrl + Z

c) Ctrl + ]

d) Esc

\*\*Correct Answer: c) Ctrl + ]\*\*

**55. Which of the following is considered a security risk and should not be run?**

a) Web server

b) Daytime server

c) DNS server

d) Mail server

\*\*Correct Answer: b) Daytime server\*\*

**56. What command is used to request a web page using Telnet?**

a) GET / HTTP/1.0

b) GET / HTTP/1.1

c) POST / HTTP/1.1

d) REQUEST / HTTP/1.1

\*\*Correct Answer: b) GET / HTTP/1.1\*\*

**57. What is the purpose of the Host header in a Telnet web request?**

a) To specify the port number

b) To specify the server address

c) To specify the protocol version

d) To specify the content type

\*\*Correct Answer: b) To specify the server address\*\*

**58. What is the main purpose of the OSI model?**

a) To define hardware specifications.

b) To describe how communication should occur in a computer network.

c) To create network protocols.

d) To manage network security.

\*\*Correct Answer: b) To describe how communication should occur in a computer network.\*\*

**59. Which layer is responsible for providing end-to-end communication and reliability?**

a) Network Layer

b) Data Link Layer

c) Transport Layer

d) Application Layer

\*\*Correct Answer: c) Transport Layer\*\*

**60. Which layer is responsible for routing packets across networks?**

a) Physical Layer

b) Data Link Layer

**c) Network Layer**

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**61. Which layer of the OSI model is closest to the end user?**

a) Physical Layer

b) Network Layer

c) Application Layer

d) Data Link Layer

\*\*Correct Answer: c) Application Layer\*\* - This is where user applications interact with the network.

**62. What is the primary function of the Physical Layer?**

a) Logical addressing

b) Defining electrical and physical specifications for data transmission

c) Error detection

d) Establishing connections

\*\*Correct Answer: b) Defining electrical and physical specifications for data transmission\*\* - It deals with the physical medium and signal encoding.

**63. The Data Link Layer is primarily concerned with:**

a) Routing packets across networks

b) Reliable data transfer between adjacent network nodes

c) End-to-end data integrity

d) Application data formatting

\*\*Correct Answer: b) Reliable data transfer between adjacent network nodes\*\* - It handles framing and MAC addressing within a local network segment.

**64. What is the main role of the Network Layer?**

a) Physical connectivity

b) Logical addressing and routing

c) Data segmentation and reassembly

d) Presentation of data to the application

\*\*Correct Answer: b) Logical addressing and routing\*\* - This layer handles IP addresses and determines the best path for data.

**65. The Transport Layer provides:**

a) Physical transmission of data

b) Logical addressing

c) End-to-end communication and data integrity

d) Network topology management

\*\*Correct Answer: c) End-to-end communication and data integrity\*\* - It manages reliable or unreliable delivery between applications.

**66. What is the purpose of the Session Layer?**

a) Data encryption and decryption

b) Establishing, managing, and terminating connections between applications

c) Physical addressing

d) Routing of data packets

\*\*Correct Answer: b) Establishing, managing, and terminating connections between applications\*\* - It controls dialogues between applications.

**67. The Presentation Layer is responsible for:**

a) Data routing

b) Ensuring reliable data transfer

c) Data formatting, encryption, and compression

d) Physical signaling

\*\*Correct Answer: c) Data formatting, encryption, and compression\*\* - It ensures data is in a usable format for the Application Layer.

**68. Which mnemonic helps in remembering the OSI model layers from bottom to top?**

a) All People Seem To Need Data Processing

b) Please Do Not Throw Sausage Pizza Away

c) Some People Do Not Throw Parties

d) Pretty Darn Nice Truckers Play

\*\*Correct Answer: b) Please Do Not Throw Spinach Pizza Away\*\* - This was explicitly mentioned in the text.

**69. A "layer 3 switch" operates at which layer of the OSI model?**

a) Data Link Layer

b) Network Layer

c) Transport Layer

d) Physical Layer

\*\*Correct Answer: b) Network Layer\*\* - Layer 3 devices make routing decisions based on IP addresses.

**70. A "layer 7 firewall" operates at which layer of the OSI model?**

a) Network Layer

b) Transport Layer

c) Application Layer

d) Data Link Layer

\*\*Correct Answer: c) Application Layer\*\* - Layer 7 firewalls can filter traffic based on application-specific content.

**71. What is another name for the Data Link Layer in the TCP/IP model?**

a) Internet Layer

b) Transport Layer

c) Link Layer

d) Application Layer

\*\*Correct Answer: c) Link Layer\*\* - The TCP/IP model consolidates the Physical and Data Link layers.

**72. Which TCP/IP layer is responsible for IP addressing and routing?**

a) Application Layer

b) Transport Layer

c) Internet Layer

d) Link Layer

\*\*Correct Answer: c) Internet Layer\*\* - This layer corresponds to the OSI Network Layer.

**73. Which TCP/IP layer handles protocols like TCP and UDP?**

a) Application Layer

b) Transport Layer

c) Internet Layer

d) Link Layer

\*\*Correct Answer: b) Transport Layer\*\* - These are the primary protocols for end-to-end communication.

**74. In the five-layer TCP/IP model, which layer is added compared to the four-layer model?**

a) Session Layer

b) Presentation Layer

c) Physical Layer

d) Network Layer

\*\*Correct Answer: c) Physical Layer\*\* - Some modern texts explicitly include the Physical Layer.

**75. What is the purpose of a subnet mask?**

a) To identify the MAC address of a device.

b) To determine which part of an IP address represents the network and which part represents the host.

c) To encrypt network traffic.

d) To translate domain names to IP addresses.

\*\*Correct Answer: b) To determine which part of an IP address represents the network and which part represents the host.\*\* - It distinguishes the network and host portions.

**76. What is a broadcast address used for?**

a) To send data to a specific host on the network.

b) To send data to all hosts on the network.

c) To identify the network itself.

d) To route packets to other networks.

\*\*Correct Answer: b) To send data to all hosts on the network.\*\* - It's a special address for network-wide communication.

**77. What is the network address?**

a) The IP address assigned to a specific host.

b) An address that identifies the network itself.

c) The address used to send data to all devices.

d) The MAC address of the router.

\*\*Correct Answer: b) An address that identifies the network itself.\*\* - It's the starting address of a network segment.

**78. How many bits are in an octet?**

a) 4

b) 8

c) 16

d) 32

\*\*Correct Answer: b) 8\*\* - An octet is a group of eight bits.

**79. What is the hexadecimal representation of a MAC address typically separated by?**

a) Hyphens (-)

b) Colons (:)

c) Periods (.)

d) Slashes (/)

\*\*Correct Answer: b) Colons (:)\*\* - This is the common format mentioned in the text.

**80. What is the purpose of the sequence number in TCP?**

a) To identify the destination port.

b) To ensure packets are delivered in the correct order and to detect lost or duplicated packets.

c) To establish a connection.

d) To acknowledge received data.

\*\*Correct Answer: b) To ensure packets are delivered in the correct order and to detect lost or duplicated packets.\*\* - It provides order and helps with reliability.

**81. What is the purpose of the acknowledgement number in TCP?**

a) To identify the source port.

b) To indicate the next expected sequence number, confirming received data.

c) To initiate a connection.

d) To indicate the size of the data being sent.

\*\*Correct Answer: b) To indicate the next expected sequence number, confirming received data.\*\* - It's how the receiver confirms successful data reception.

**82. What is the first packet sent in a TCP three-way handshake?**

a) ACK

b) SYN-ACK

c) SYN

d) FIN

\*\*Correct Answer: c) SYN\*\* - The client initiates the connection with a SYN packet.

**83. What is the second packet sent in a TCP three-way handshake?**

a) ACK

b) SYN

c) SYN-ACK

d) FIN

\*\*Correct Answer: c) SYN-ACK\*\* - The server responds with a SYN and acknowledges the client's SYN.

**84. What is the third packet sent in a TCP three-way handshake?**

a) SYN

b) SYN-ACK

c) ACK

d) FIN

\*\*Correct Answer: c) ACK\*\* - The client acknowledges the server's SYN-ACK, establishing the connection.

**85. Encapsulation allows each layer to:**

a) Communicate directly with all other layers.

b) Focus on its intended function.

c) Modify the data from other layers.

d) Bypass the layers above it.

\*\*Correct Answer: b) Focus on its intended function.\*\* - Each layer adds its own information without needing to understand the data itself.

**86. During encapsulation, what is added to the data at the Transport Layer (TCP)?**

a) IP header

b) MAC address

c) TCP header

d) Ethernet trailer

\*\*Correct Answer: c) TCP header\*\* - This header contains information for reliable transport.

**87. During encapsulation, what is added to the TCP segment at the Network Layer?**

a) Ethernet header

b) UDP header

c) IP header

d) Application data

\*\*Correct Answer: c) IP header\*\* - This header contains source and destination IP addresses for routing.

**88. During encapsulation, what is added to the IP packet at the Data Link Layer (Ethernet)?**

a) TCP header

b) UDP header

c) Ethernet header and trailer

d) IP header

\*\*Correct Answer: c) Ethernet header and trailer\*\* - These contain MAC addresses and frame check sequences.

**89. What is the reverse process of encapsulation called?**

a) Segmentation

b) Fragmentation

c) De-encapsulation

d) Reassembly

\*\*Correct Answer: c) De-encapsulation\*\* - Each layer on the receiving end removes its corresponding header (and trailer).

**90. When you enter a search query on a website, which protocol is typically used by your web browser at the Application Layer?**

a) TCP

b) UDP

c) IP

d) HTTPS

\*\*Correct Answer: d) HTTPS\*\* - This secure version of HTTP is commonly used for web interactions.

**91. In the life of a packet, after the link layer adds its header and trailer, where is the packet sent next?**

a) The destination web server

b) The user's application

c) The router

d) The transport layer

\*\*Correct Answer: c) The router\*\* - This is the first network device the packet encounters.

**92. What happens at each router the packet encounters on its way to the destination?**

a) It adds a new link layer header and trailer.

b) It removes the IP header.

c) It inspects the destination IP address and forwards the packet.

d) It establishes a TCP connection.

\*\*Correct Answer: c) It inspects the destination IP address and forwards the packet.\*\* - Routing decisions are made at this layer.

**93. On a WiFi network, an IP packet will be encapsulated within a:**

a) TCP segment

b) UDP datagram

c) Frame

d) Packet

\*\*Correct Answer: c) Frame\*\* - The Data Link Layer (WiFi) creates frames.

**94. The UDP data unit that encapsulates the application data is called a:**

a) Segment

b) Packet

c) Frame

d) Datagram

\*\*Correct Answer: d) Datagram\*\* - This is the specific term for a UDP data unit.

**95. The data unit that encapsulates the application data sent over TCP is called a:**

a) Datagram

b) Packet

c) Segment

d) Frame

\*\*Correct Answer: c) Segment\*\* - This is the specific term for a TCP data unit.

**96. What does TELNET allow you to do?**

a) Securely transfer files.

b) Browse web pages.

c) Connect to and communicate with a remote system using text commands.

d) Translate domain names to IP addresses.

\*\*Correct Answer: c) Connect to and communicate with a remote system using text commands.\*\* - This is the primary function of Telnet.

**97. What type of server echoes back everything you send to it?**

a) Web server

b) Daytime server

c) Echo server

d) FTP server

\*\*Correct Answer: c) Echo server\*\* - Its function is to send back received data.

**98. What information does the daytime server typically provide?**

a) The IP address of the client.

b) The current date and time.

c) A web page.

d) A list of connected users.

\*\*Correct Answer: b) The current date and time.\*\* - This is the service it provides.

**99. To connect to a specific service on a remote host using Telnet, you need to specify the host's IP address and the:**

a) MAC address

b) Subnet mask

c) Port number

d) Protocol type

\*\*Correct Answer: c) Port number\*\* - Port numbers identify specific applications or services.

**100. When requesting a web page using Telnet on port 80, what is essential to include in the command after "GET / HTTP/1.1"?**

a) Your MAC address

b) The server's MAC address

c) The Host header specifying the server's address

d) Your local IP address

\*\*Correct Answer: c) The Host header specifying the server's address\*\* - This is required by HTTP/1.1 to identify the target server when multiple websites might share an IP address.