**1. In the following pairs of OSI protocol layers and their functionality, which one is the CORRECT pair / s? [MSQ]**

1) Network layer and Routing
2) Data Link Layer and Bit synchronisation
3) Transport layer and End-to-end process communication
4) Medium Access Control sublayer and Channel sharing

A) 1 & 2 only B) 2 & 3 only
C) 1, 2 & 3 D) 1, 3 & 4 only

**2. In the following pairs of OSI protocol layer and their functionality, which one is the CORRECT pair / s? [MSQ]**

1) Segmentation and reassembly are done at hosts only, not at each intermediate router.
2) The Application Layer allows the user or application to access the network.
3) The Session Layer establishes, maintains, and synchronises the interaction between the communicating systems.
4) The Presentation Layer allows the process to add checkpoints or synchronisation points in the stream of data.

A) 1 & 2 only B) 2 & 3 only
C) 1, 2 & 3 D) 3 & 4 only

Answer:(C):
Explanation:
True, Segmentation and reassembly are functionalities of the Transport Layer. The transport layer is absent at routers. So, segmentation and reassembly are done only at the source or destination.
True, the Application Layer provides applications to users to access network resources.
True, the Session Layer establishes, maintains, and synchronises the interaction between the communicating systems. Session Layer allows the process of adding checkpoints or synchronisation points to the stream of data.
False, Presentation Layer handles the syntax and semantics of information sent.

**3. Which of the following is/are CORRECT? [MSQ]**

1) Physical addresses in the packet are modified from HOP to HOP.
2) Network Layer ensures packets belonging to the same message arrive intact and in order.
3) The network layer uses physical addresses for addressing.
4) The Transport Layer treats every packet individually.

A) 1 only B) 2 & 3 only
C) 1, 2 & 3 D) 3 & 4 only

Answer:(A)
Explanation:
True, the MAC addresses of the next HOP are updated on every intermediate router.
False, at Network Layer all the packets belonging to the same message are treated as different packets.
False, The Network layer uses logical addresses for addressing.
False, Transport Layer ensures that the whole message arrives intact and in order.

**4. Match the following to one or more layers of the OSI model:**

A) 1-g,2-c,3-b,4-d
B) 1-b,2-c,3-a,4-d
C) 1-a,2-c,3-b,4-d
D) 1-g,2-c,3-f, 4-d

| | |
|---|---|
| 1. Transport Layer | a. Reliable process-to-process message delivery<br>b. Route selection |
| 2. Data Link Layer | c. Defines frames<br>d. Provides user services such as e-mail and file transfer |
| 3. Network Layer | e. Uses service point addressing<br>f. Delivery of packets as an individual entity. |
| 4. Application Layer | g. Delivery of each packet independently |

Answer:(C)
Explanation:
Transport Layer:
1. Reliable process-to-process message delivery
2. Uses Service point addressing called port numbers

Data Link Layer:
1. Defines frames

Network Layer:
1. Route selection
2. Delivery of each packet independent of the entire message

Application Layer:

1. Provides user services such as e-mail and file transfer.

**5. Choose the correct statement/s: [MSQ]**

1) The unit of communication at the physical layer is a bit.
2) The unit of communication at the network layer is a datagram.
3) The unit of communication at the transport layer is a segment.
4) The unit of communication at the transport layer is a user datagram or a packet.

A) 1 & 2 only B) 2 & 3 only

C) 1, 2 & 3 D) 1, 2, 3 & 4

Answer: (D)
Explanation:
Physical Layer - Bit
Data Link Layer - Frame
Network Layer - Datagram
Transport Layer - Segment or Packet and User Datagram, based on the protocols TCP and UDP, respectively.
Application Layer - Message

**6. Choose the incorrect statement/s: [MSQ]**

1) The computer used for forwarding IP packets is called an IP router
2) The Session Layer decides whether the way of communication between them is Half Duplex or Full Duplex.
3) The physical addresses will change from hop to hop, but the logical and port addresses usually remain the same
4) The two most typical network applications that use UDP are File Transfer Protocol (FTP) and the TELNET

A) 1 & 2 only B) 2 & 3 only

C) 1 & 3 only D) 4 only

Answer:(D)
Explanation:

Option 1, 2, and 3 are all True,

The only option is 4 false.

Reliability is key for FTP and TELNET applications, So these applications use TCP.

**7. Match the protocols from Group I to one or more in Group II:**

A) 1- A,2-B,3-C,4-D,5-E,6-F

B) 1- B,2-B,3-C,4-E,5-D,6-F

C) 1- A,2-B,3-G,4-E,5-D,6-H

D) 1- B,2-B,3-G,4-D,5-E,6-H

| Group I | Group II (port, TCP/UDP) |
|---|---|
| 1. TELNET | A. 23 TCP |
| 2. SMTP | B. 25 TCP |
| 3. DHCP-SERVER | C. 67 UDP |
| 4. FTP - DATA | D. 20 TCP |
| 5. FTP - CONTROL | E. 21 TCP<br>F. 68 UDP |
| 6. DHCP-CLIENT | G. 67 TCP |
| | H. 68 TCP |

Answer:(A)
Explanation:

| Port Number | TCP/UDP | Protocol |
|---|---|---|
| 20 | TCP | FTP-DATA |
| 21 | TCP | FTP-CONTROL |
| 22 | TCP | SSH |
| 23 | TCP | TELNET |
| 25 | TCP | SMTP |
| 67 | UDP | DHCP-SERVER |
| 68 | UDP | DHCP-CLIENT |
| 80 | TCP | HTTP |
| 110 | TCP | POP-3 |
| 443 | TCP | HTTPS |

**8: Match the following? [MSQ]**

| | |
|---|---|
| 1. Data Link Layer | a. IP address |
| 2. Network Layer | b. MAC Address |
| 3. Transport Layer | c. Well Known Port number |
| | d. point-to-point protocol |

1) 1-a, 2-d, 3-b
2) 1-d, 2-a,3-c
3) 1-b, 2-a,3-c
4) 1-b, 2-a, 3-d

A) 1 & 2 only
B) 2 & 3 only
C) 1 & 3 only
D) 4 only

Answer:(B)
Explanation:

Data Link layer:
At the data link layer, we need a MAC address to choose one node among several nodes if the connection is not point-to-point.
Point-to-Point Protocol (PPP) is a data link layer communication protocol between two routers directly without any host or any other networking in between.

Network Layer:
The network layer is responsible for the delivery of datagrams between two hosts, which is called host-to-host delivery, where we need an IP address to choose one host among millions.

Transport Layer :
At the transport layer, we need a transport layer address called a port number. Universal port numbers are also called well-known port numbers.

**9. Which layer of the ISO-OSI layer is responsible for the synchronisation of the stream of data?**

A) Session Layer B) Presentation Layer
C) Network Layer D) Data Link Layer

Answer:(A)
Explanation:

The session layer is responsible for dialogue control and synchronisation.

The session layer allows a process to add checkpoints, or synchronisation points, to a stream of data.

**10. Assume that a Source in INDIA and Destination Silicon Valley are connected through three intermediate routers in between. Determine how many times each packet has to visit the network layer, data link layer, and physical layer during transmission from source to destination.**

A) 5, 5, 5 B) 2, 4, 8

C) 2, 5, 8 D) 5, 8, 8

Answer:(D)
Explanation: