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Date : 02-08-24

### Assignment- Networking

1. Among A and B, select which one is software layer and which one is hardware layer in Open Systems Interconnection Model.

Software layers: Application layer, Presentation layer, Session layer.

Hardware layers: Network layer, Data Link layer, Physical layer.

2. HTTPS uses which protocol for security?

HTTPS uses SSL/TLS protocols for security.

3. Apart from LAN, VAN, and MAN, what do you understand by VPN?

A VPN (Virtual Private Network) is a technology that creates a secure, encrypted connection over a less secure network, typically the internet. It allows users to send and receive data as if their devices were directly connected to a private network.

4. Digital Signatures, as the name sounds, are the new alternative to signing a document digitally. What other authenticity have you used over the network in regular life?

Other forms of network authentication commonly used include passwords, multi-factor authentication (MFA), biometric authentication (fingerprints, facial recognition), and token-based authentication.

5. After the authentication is successful, \_\_\_\_\_ (Authorization/Communication) can be used to determine what resources the user is allowed to access and the operations that can be performed.

Authorization can be used to determine what resources the user is allowed to access and the operations that can be performed.

6. A firewall is a network security device, either hardware or software-based, which monitors all incoming and outgoing traffic, and based on a defined set of security rules, it accepts, rejects, or drops that specific traffic.

	Source IP	Dest. IP	Source Port	Dest. Port	Action
1	192.168.21.0	--	--	--	deny
2	--	--	--	23	deny
3	--	192.168.21.3	--	--	deny
4	--	192.168.21.0	--	>1023	Allow

Sample Packet Filter Firewall Rule

Consider above Packet firewall rule. Now Network IP: 192.168.21.0, Trying to connect to your machine and want to send data. Is the Action allowed, as per above table firewall rule? (Allow/Deny)

Rule 1: Source IP: 192.168.21.0 -> Action: deny

7. Application Layer Firewall, software Firewall, and Hardware Firewall allow only destined and avoid malicious data. If these firewalls are not installed, your application may receive \_\_\_\_\_ data (malicious / all Secured) data.

If these firewalls are not installed, your application may receive malicious data.

8. When a bigger network is divided into smaller networks, in order to maintain security and to maintain smaller networks easier using the routing table, we go for \_\_\_\_\_ (Subnetting/Firewall).

Subnetting.

9. Move A and B to corresponding IP assignment.

Static IP Address:

- Provided by ISP (Internet Service Provider).
- A) This IP address does not change at any time, which means if an IP address is provided then it can't be changed or modified and is easily traceable.

Dynamic IP Address:

- Provided by DHCP (Dynamic Host Configuration Protocol).
- B) These addresses change at any time and are not easily traced.

10. List any two differences between MAC address, IP address, and Network Address.

### MAC Address

1. Layer of Operation:
  - Operates at the Data Link Layer (Layer 2) of the OSI model.
2. Purpose:
  - Uniquely identifies a device within a local network.

### IP Address

1. Layer of Operation:
  - Operates at the Network Layer (Layer 3) of the OSI model.
2. Purpose:
  - Identifies devices on a network and facilitates communication between them across different networks.

### Network Address

1. Layer of Operation:
  - Operates at the Network Layer (Layer 3) of the OSI model.
2. Purpose:
  - Identifies the network segment within an IP address, allowing routers to determine the network path for data packets.

11. Match numbers with letters according to 7 layers roles:

- A. Physical Layer: Bit Stream, physical medium, Cable, Connectors
- B. Data Link Layer: MAC Address, Flow control, Frames, switches, ARP
- C. Presentation Layer: Coding into 1s and 0s, encryption, compression, JPG, HTTPS, SSL, TSL, ASCII, Data
- D. Session Layer: Authentication, Permission, connection between two hosts, NetBIOS, PPTP, RPC, API, Data
- E. Transport Layer: End-to-End Error Control, TCP, UDP, Segment
- F. Network Layer: Routing, switching, IPV4, IPV6, IPSec, Packet
- G. Application Layer: Message format, Human-Machine interfaces, HTTP, FTP, Data

12.DNS is a host name to IP address translation service. Use ping amazon.com and share IP address.

Pinging amazon.com [54.239.28.85] with 32 bytes of data:

Reply from 54.239.28.85: bytes=32 time=421ms TTL=237

Reply from 54.239.28.85: bytes=32 time=458ms TTL=237

Reply from 54.239.28.85: bytes=32 time=453ms TTL=237

Reply from 54.239.28.85: bytes=32 time=411ms TTL=237

Ping statistics for 54.239.28.85:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 411ms, Maximum = 458ms, Average = 435ms

13.From the routing table, which Interface should be chosen for Network ID 172.16.0.0:  
(A/B)

Interface B should be chosen for Network ID 172.16.0.0 based on the given subnet mask.

