Explain count to infinity problem in Distance Vector Routing.

In Distance-vector routing, “cost increase” propagate slowly and “cost decreases” propagate quickly. Distance-vector routing takes some time for all other routers to become aware of a broken connection (cost becoming infinity), which is necessary for a routing protocol to function properly.

What is the difference between applications and packet filtering firewalls?

Application Firewall	**Packet Filter Firewall**
Sees full data portion of a packet	See only addresses and service protocol type
Not transparent to the user	Transparent to user
High impact on network performance	Low impact on network performance
Complex	Simple
Network topology can hide from the attacker	Network topology cannot hide
Screens based on behaviour	Screens based on connection rules
Auditing is easy	Auditing is difficult

Compare OSI reference model with TCP/IP protocol suite

OSI Model	**TCP/IP Model**
OSI stands for Open Systems Interconnection.	TCP/IP stands for Transmission Control Protocol/Internet Protocol.
It has 7 layers.	It has 4 layers.
Less reliable	More reliable
Package delivery is guaranteed	Package delivery is not guaranteed
Vertically approached	Horizontally approached
Less used	More used

How TCP provides reliability in the network?

TCP provides reliability by assigning a sequence number to each octet it transmits and requiring a positive acknowledgment (ACK) from the receiving TCP. If the ACK is not received within the time-out interval, the data is retransmitted. At the receiver, the sequence numbers are used to correctly order segments. Error is handled by adding a checksum to each segment transmitted.

What is congestion control? Discuss Leaky Bucket Algorithm and Token Bucket Algorithm in detail.

Congestion occurs in network layer when the message traffic is so heavy that it slows down network response time. Congestion control is a mechanism to control congestion.

Leaky Bucket Algorithm

1. When host wants to send packet, packet is thrown into the bucket.
2. The bucket leaks at a constant rate, meaning the network interface transmits packets at a constant rate.
3. Bursty traffic is converted to a uniform traffic by the leaky bucket.
4. The bucket is a finite queue that outputs at a finite rate.

Token Bucket Algorithm

1. In regular intervals tokens are thrown into the bucket. ƒ
2. The bucket has a maximum capacity. ƒ
3. If there is a ready packet, a token is removed from the bucket, and the packet is sent.
4. If there is no token in the bucket, the packet cannot be sent.

Why AAL5 is used to encapsulate an IP datagram?

1. It reduces overhead
2. It doesn't add a header
3. It can handle IP datagrams of any size
4. It is simple and reliable

What are asymmetric key ciphers? Explain with one algorithm

Public Key Cryptography

List five types of OSPF packets.

1. Hello
2. Database Description (DBD)
3. Link State Request (LSR)
4. Link State Update (LSU)
5. Link State Acknowledgement (LSAck)

Discuss link state update packets in detail

Link state update(LSU) packet disseminate Link State Advertisements (LSAs) throughout an OSPF network. They play a crucial role in OSPF's topology discovery and maintenance. They enable routers to construct and update their Link State Databases (LSDBs).

Operations performed by LSU:

1. **LSA Generation:** Routers generate LSAs based on changes in their link states.
2. **Flooding:** LSU packets are flooded throughout the OSPF area, ensuring all routers receive LSAs.
3. **Acknowledgment**: LSUs are acknowledged with Link State Acknowledgment (LSAck) packets.

Explain three timers used in RIP

1. **Periodic Timer (Update Timer):** Triggers regular routing updates to be sent to neighbouring routers. Default Value: 30 seconds.
2. **Expiration Timer (Invalid Timer):** Marks routes as invalid if not refreshed within a certain time. Default Value: 180 seconds.
3. **Garbage Collection Timer (Flush Timer):** Determines how long invalid routes remain in the routing table before final removal. Default Value: 240 seconds

Compare and contrast the fields in the main header of IPv4 and IPv6. Make a table that shows the presence and absence of each field.