**Studytonight – CN test 1 – Aditya Jain**

1. **Choose the best matching between Group 1 and Group 2:**

**Group 1 Group 2**

P. Data Link Layer 1. Ensures reliable transport of data over a Physical point-to-point link.

Q. Network Layer 2. Encodes/Decodes data for physical transmission.

R. Transport Layer 3. Allows end-to-end communication between two processes.

4. Routes data from one network node to the next.

1. **P-1, Q-4, R-3**
2. P-2, Q-4, R-1
3. P-2, Q-3, R-1
4. P-1, Q-3, R-2
5. **Which of the following is not a client-server application?**
6. Internet Chat
7. Web Browsing
8. E-mail
9. **Ping**

Soln : PING is a utility, to check connectivity either between client-client or client-server.

1. **The maximum window size for data transmission using the selective reject protocol with n-bit frame sequence number is :**
2. 2^n
3. **2^(n-1)**
4. 2^n – 1
5. 2^(n-2)

Soln : Let :

Window size of Server be WS

Window size of Receiver be WR

Then, WS + WR = 2^n.

If WR = WS, then the maximum window size will be 2^(n-1).

1. **In a network of LANs connected by bridges, packets are sent from one LAN to another through intermediate bridges. Since more than one path may exist between two LANs, packets may have to be routed through multiple bridges. Why is spanning tree algorithm used for bridge-routing?**
2. For shortest path routing between LANs
3. **For avoiding loops in the routing paths**
4. For fault tolerance
5. For minimizing collisions

Soln: To avoid infinite looping network layer uses TTL, Data Link Layer constructs Spanning tree among bridges to avoid infinite loop in routing paths.

1. **In Ethernet when Manchester encoding is used, the bit rate is:**
2. **Half the baud rate**
3. Twice the baud rate
4. Same as the baud rate
5. None of the above

Soln: **Baud rate**- It is the rate at which information is transferred in a communication channel. For example: In the serial port context, “**9600 baud**” means that the serial port is capable of 9600 bits per second.

In Manchester encoding, we use two signal changes to represent a bit. Therefore always baud rate is twice the bit rate. Hence bit rate is half the baud rate.

1. **There are n stations in a slotted LAN. Each station attempts to transmit with a probability p in each time slot. What is the probability tat ONLY one station transmits in a given time slot?**
2. **np(1-p)^(n-1)**
3. (1-p)^(n-1)
4. p(1-p)^(n-1)
5. 1- (1-p)^(n-1)

Soln:

Probability of a station not to transfer packet = 1-p.

To get a successful transmission for a single station, remaining (n-1) stations should not transfer a packet. Hence, probability for (n-1) station not to transfer packet = (1-p)^(n-1)

To get successful transmission for a single station among ‘n’ stations = np(1-p)^(n-1).

1. **Which of the following assertions is FALSE about the Internet Protocol (IP)?**
2. It is possible for a computer to have multiple IP address.
3. IP packets from the same source to the same destination can take different routes in the network.
4. IP ensures that a packet is discarded if it is unable to reach its destination within a given number of hops.
5. **The packet source cannot set the route of an outgoing packets, the route is determined only by the routing tables in the routers on the way.**

Soln : There are two types of routing

1. Router routing where router decides outgoing route of the packet.
2. Source mounting where source can decide the route.

Hence option ‘d’ is false.

1. **Which of the following functionalities must be implemented by a transport protocol over and above the network protocol?**
2. Recovery from packet losses
3. Detection of duplicate packets
4. **Packet delivery in the correct order**
5. End to end connectivity

Soln : TCP and UDP are the transport layer protocols. Removes form packet losses, Detection of duplicate packets and end to end connectivity are the responsibilities of TCP but not UDP. Packet delivery in the correct order is must for both TCP and UDP.

1. **Which of the following is NOT true with respect to a transparent bridge and a router?**
2. Both bridge and router selectively forward data packets
3. **A bridge uses IP address while a router uses MAC address**
4. A bridge builds up its routing table by inspecting incoming packets
5. A router can connect between a LAN and a WAN

Soln : Bridge works at Data Link Layer. Hence, operation is based on MAC address, Router works at Network Layer and hence uses IP address.

1. **The address resolution protocol (ARP) is used for:**
2. Finding the IP address from the DNS (Domain Name System)
3. Finding the IP address of the default gateway
4. Finding the IP address that corresponds to a MAC address
5. **Finding the MAC address that corresponds to an IP address**

Soln: IP address to MAC mappings are available in ARP tables.

1. For which one of the following reasons does Internet Protocol (IP) use the time-to-live (TTL) field in the IP datagram header?
2. Ensure packets reach destination within that time
3. Discard packets that reach later than that time
4. **Prevent packets from looping indefinitely**
5. Limit the time for which a packet gets queued in intermediate routers

Soln: Router is using default route to transfer packets if DIP of the packet does not match with any of the entries in its routing table. Default route leading to infinite looping sometimes, hence TTL (it restricts life period of the packet) is used to avoid infinite looping.

1. What is the maximum size of data that the application layer can pass on to the TCP layer below?
2. **Any size**
3. 2^16 bytes – size of TCP header
4. 2^16 bytes
5. 1500 bytes

Soln: Application layer can forward any size of the data to transport layer, but Transport layer should ensure that each segment should be of 64 KB.

1. Which of the following system calls results in the sending of SYN packets?
2. socket
3. bind
4. listen
5. **connect**

Soln: When a user process invokes the connect() system call, the active endpoint send a synchronize packet (SYN).

1. In a packet switching network, packets are routed from source to destination along a single path having two intermediate nodes. If the message size is 24 bytes and each packet contains a header of 3 bytes, then the optimum packet size is:
2. 4
3. 6
4. 7
5. **9**

Soln : It optimum packet size is 9, then data = 9-3 = 6 bytes hence we need only 4 packets to carry 24 bytes. In option , a), b), c) number of packets transmitted worked be more than 4 and hence network traffic is more.

1. In the slow start phase of the TCP congestion control algorithm, the size of the congestion window
2. Does not increase
3. Increase linearly
4. Increases quadratically
5. Increases exponentially

Soln : In slow start phase, congestion window increases exponentially as shown in the below figure:

