# 10 Computer Network

## Practice Questions

**Q.1** Match the following

**OSI Layer**

1. Network Layer
2. Transport Layer
3. Data Link Layer
4. Session Layer
5. Presentation Layer
6. Physical Layer

**Responsibilities**

p. Encoding & Translation
q. Feedback Messaging
r. Transmission Modes
s. Segmentation and Reassembly
t. Dialogue Control
u. Access Control

(A) 1-s, 2-t, 3-u, 4-r, 5-p, 6-q
(B) 1-q, 2-s, 3-u, 4-t, 5-p, 6-r
(C) 1-s, 2-u, 3-p, 4-r, 5-q, 6-t
(D) 1-q, 2-u, 3-p, 4-t, 5-s, 6-r

**Q.2** Let a cluster of stations share 48 kbps of pure Aloha channel. Every station outputs frames of length 1024 bits on an average of every 50 seconds. Then what is the maximum value of number of stations?

(A) 413 (B) 431
(C) 453 (D) 435

**Q.3** An $IPV_4$ Packet has the first hexadecimal digits as show below

$0\times4500005C000300005906\ldots$

How many hops can this packet take before being dropped?

(A) 30 (B) 59
(C) 89 (D) 90

**Q.4** Consider a 8 Mbps token LAN with a ring latency of 256 µsec. A host need to transmit seizes the token, and then it sends a frame of 1024 bytes removes the frame after it has circulated all around the ring and finally releases the token. This process is repeated for every frame. Assuming that only a single host wishes to transmit, then the effective data rate in Mbps is? _____.

**Q.5** In an IPv4 Packet, the value of HLEN is 15, and the value of the total length field is $0\times0064$. How many bytes of data are being carried by this packet?

(A) 85 bytes (B) 49 bytes
(C) 40 bytes (D) 20 Bytes

**Q.6** An IPv4 datagram has arrived in which the offset value is 800, the value of HLEN is 8, and the value of the total length field is 500 and the *M* bit is 0, what are the numbers of the first byte,

the last byte and the position of the datagram?

(A) 6400, 6887 and Last fragment

(B) 6400, 6867 and First fragment

(C) 6400, 6867 and Last fragment

(D) 801, 1268 and First fragment

**Q.7** A sliding window protocol of 4 Mbps point to point Link has propagation delay of 0.5 sec. Assume that each frame carries 2 KB of data. What is the maximum number of bits used for the sequence number field?

(A) 10 (B) 9

(C) 12 (D) 8

**Q.8** The following is a dump of UDP header in hexadecimal format

*5EFA00FD001C3297*

What is the total length of user datagram? Is the packet from client to server or vice versa?

(A) 30 bytes and packet is going from client to server

(B) 28 bytes and packet is going from client to server

(C) 30 bytes and packet is going from server to client

(D) 28 bytes and packet is going from server to client

**Q.9** If size of a TCP segment is 1 kB and header length value is 6, the sequence number $= 3500$. Given that URG Flag $= 1$ and URG pointer $= 45$. How many of them are urgent

Give the sequence numbers of urgent data.

(A) 45 bytes of urgent data, sequence number 3500 – 3544

(B) 45 bytes of urgent data, sequence number 1024 – 1069

(C) 46 bytes of urgent data, sequence number 1024 – 1070

(D) 46 bytes of urgent data, sequence number 3500 – 3545

**Q.10** If the initial sequence number is 1 and it increment the counter by 256000 for every 2 sec, how long does it take for the counter to wrap around

(A) 33, 554 seconds

(B) 44, 554 seconds

(C) 33, 455 seconds

(D) 44, 455 seconds

**Q.11** If IRTT $= 45$ sec, NRTT $= 60$ sec, $\alpha = 0.9$ and initial deviation is 8 sec then calculate Time out.

(A) 80.5 (B) 81.3

(C) 82.5 (D) 80.0

**Q.12** Which of the following is/are true about TCP? **[MSQ]**

(A) It is a byte oriented port to port communication

(B) It uses a combination of SR and Go-Back *N* for flow control

(C) It connections are Link to Link and full duplex

(D) It uses piggybacking-whenever possible

**Q.13** IP packets whose total length (data plus header) is 16 kb basting out of a router live for 15 seconds. The maximum line speed (in Mbps) of the router can operate at without cycling through the IP datagram identification number space is?

(A) 68.266 (B) 57.233

(C) 8.533 (D) 10.333

**Q.14** A building running CSMA-CD Protocol is having a bandwidth of 512 Mbps and distance of 2 km then determine the

minimum data size in order to detect a collision. Assume that the signal speed is $2\times10^5$ km/s.

(A) 1000 Bytes

(B) 1250 bytes

(C) 1280 bytes

(D) 1024 bytes

**Q.15** A system user the sliding window protocol is having a bandwidth of 10 Mbps with a window size of 100. What is the size of data if the distance between the Sender and receiver is 72000 km and the propagation speed is $3\times10^8$ m/sec? Given Utilization is 0.5

(A) 2048 bytes

(B) 3015 bytes

(C) 4096 bytes

(D) 3072 bytes

**Q.16** Given the maximum lifetime of a segment is 30 sec and link capacity is 500 Mbps, find the number of bits required to avoid wrap around during this time?

(A) 10 bits (B) 23 bits

(C) 30 bits (D) 31 bits

**Q.17** Determine the efficiency of token ring with a data rate of 250 Mbps, a ring latency of 120 µsec and 5000-bit packets. Assume $N$ hosts wants to transmit and each host holds the token for a maximum of frame transmission time.

(A) $\frac{N}{7N+6}$ (B) $\frac{50N}{7N+6}$

(C) $\frac{50N}{N+6}$ (D) $\frac{N}{N+6}$

**Q.18** If bandwidth of a token ring is 48 Mbps and token holding time is 5 ms then find the minimum and maximum payload in bytes?

(A) 46, 240000 (B) 0, 30000

(C) 21, 19982 (D) 0, 29979

**Q.19** Suppose that the flag pattern in framing protocol is given as 01111. If the transmitted data is 101110100111001101. The what is the number of stuff bits in transmitted data X?

**Q.20** Calculate the effective throughput for transferring a 1000 KB file assuming TCP using slow start congestion control technique. Given the round-trip time 100 ms, and maximum segment size is 1460 Bytes. Assume there are no losses and both the bandwidth and the receiver window size is infinite.

(A) 5 Mbps (B) 10 Mbps

(C) 1 Mbps (D) 1 Mbps

**Q.21** An organization is granted the block 150.36.0.0/16

The administrator wants to create 512 Subnets.

What is the Subnet mask?

(A) 255.255.255.128

(B) 255.255.255.192

(C) 255.255.255.224

(D) 255.255.255.240

**Q.22** Which of the following uses UDP as the transport layer protocol?

(A) HTTP (B) Telnet

(C) SMTP (D) DNS

**Q.23** In Ethernet, when Manchester Encoding is used, the bitrate is

(A) Half the Band Rate

(B) Twice the Band Rate

(C) Same as Baud Rate

(D) None of the above

**Q.24** Station A need to send a message consisting of 15 Packets to Station 'B' Using a sliding window ($W_S = 4$) and go-back-N error control strategy. All Packets are ready and immediately available for transmission. If every 6th Packet that 'A' transmits gets lost (but no Acks from 'B' ever gets lost), then what is the number of Packets that 'A' will transmit for sending the message to 'B'?

(A) 29 (B) 21
(C) 27 (D) 25

**Q.25** Suppose a CSMA/CD Network is operating 1 Gbps, and suppose there are no repeaters and the length of cable is 1 km. Determine the minimum frame size is the signal propagation speed is 200 km/ms.

**Q.26** A 25 Kbps satellite link has a propagation delay of 400 s. The transmitter employs "Selective Repeat" Scheme with $N$ set to 8. Assume each frame is 100 Bytes long. What is maximum bandwidth Utilization? (Where $N$ is window size).

(A) 5 Kbps (B) 7.7 Kbps
(C) 15 Kbps (D) 10 Kbps

**Q.27** A channel has a bit rate of 4 Kbps and one-way propagation delay of 20 ms. The channel uses stop-&-wait protocol. The transmission time of acknowledgement frame is negligible. To get a channel efficiency of atleast 75%, the minimum frame size should be

(A) 480 B (B) 480 bits
(C) 160 Bytes (D) 160 bits

**Q.28** Which of the following is/are an application Layer service?

**[MSQ]**

(A) Remote login
(B) Mail service
(C) File transferred access
(D) None

**Q.29** Column Matching

| | | | |
|---|---|---|---|
| A. | Bridge | (i) | Optical wire |
| B. | Ethernet | (ii) | CSMA/CD |
| C. | FTP | (iii) | Layer 2 |
| D. | Light | (iv) | Out of Bond |
| E. | HTTP | (v) | Port No. 80 |

Which of the following options match correctly?

(A) A-iii, B-i, C-v, D-ii, E-iv
(B) A-iii, B-ii, C-iii, D-iv, E-v
(C) A-iv, B-ii, C-v, D-iv, E-ii
(D) A-iii, B-ii, C-iv, D-i, E-v

**Q.30** Which one of the following can't be a broadcast ID with subnet mask 255.255.255.240?

(A) 201.201.201.159
(B) 201.201.201.199
(C) 201.201.201.207
(D) 201.201.201.143

**Q.31** The routing table of a router is shown as below :

| Destination | Subnet mask | Interface |
|---|---|---|
| 128.75.43.0 | 255.255.255.0 | Eth0 |
| 128.75.43.0 | 255.255.255.128 | Eth1 |
| 192.12.17.5 | 255.255.255.255 | Eth2 |
| Default | | Eth3 |

On which interface will the router forward Packets addressed to destination 128.75.43.16 and 192.12.17.10 respectively?

(A) Eth1 and Eth3
(B) Eth0 and Eth3
(C) Eth0 and Eth2
(D) Eth1 and Eth2

**Q.32** The Subnet mask for a particular network is 255.255.252.0. Which of the following pairs of IP addresses could belong to this network?

(A) 172.57.88.62 and 172.57.87.233
(B) 10.35.28.2 and 10.35.29.4
(C) 191.203.31.87 and 191.234.31.88
(D) 128.8.129.43 and 128.8.131.42

**Q.33** In a Network of LANs connected by bridges, Packets are sent from one LAN to another through intermediate bridges. Why is the spanning free algorithm used for bridge routing?

(A) For shortest path routing between LANs
(B) For avoiding Loops in the routing paths
(C) For fault tolerance
(D) For minimizing collisions

**Q.34** What is the Primary Purpose of ARP?

(A) Translate URLs to IP address.
(B) Resolve IPV4 addresses to MAC Address
(C) Provide dynamic IP configuration to Network devices.
(D) Convert interval private addresses to external public addresses.

**Q.35** A 3000 km Long trunk operates at 1.536 Mbps and it is used to transmit 64 Bytes frames. If it uses sliding window protocol then what is the number required of bit for sequence numbers. Assume propagation speed of 8 km/microsec?

(A) 3 (B) 5
(C) 2 (D) 4

**Q.36** Consider a MAN with server and destination of 20 km apart and one way delay is 2 minutes. At what data rate does RTT equals to transmission delay for 2 KB data?

(A) 41 bits/sec (B) 68.2 bps
(C) 69 bps (D) 40 bps

**Q.37** Let Computer A and B have IP addresses 72.195.126.113 and 72.195.126.91 respectively and both uses Subnet mask '*N*'. Then what is the value of '*N*' that should not be used out of following. If both belong to same network?

(A) 255.255.255.0
(B) 255.255.255.128
(C) 255.255.255.192
(D) 255.255.255.224

**Q.38** Resource Reservation is a feature of :

(A) Circuit switching
(B) Packet switching
(C) Both (A) and (B)
(D) None

**Q.39** Two popular routing algorithm are Distance Vector (DV) and Link State (LS) routing. Which of the following are true?

(a) Count-to-infinity is a problem only with DV, not LS.
(b) In LS, Shortest Path algorithm, run only at one node.
(c) In DV, the shortest path algorithm, run only at one node.
(d) DV requires Less number of messages then LS.

(A) a, b and d (B) a, c and d
(C) b and c only (D) a and d only

**Q.40** The transport Layer Protocols used for real time multimedia, FTP, DNS and email respectively are :

(A) TCP, UDP, UDP and TCP
(B) UDP, TCP, TCP and UDP
(C) UDP, TCP, UDP and TCP
(D) TCP, UDP, TCP and UDP

**Q.41** Consider TCP connection in a state where there are no outstanding Acks. The sender sends two segments back to back. The seque numbers of first and second segments are 750 and 870 respectively, The first segment was lost, but second was received correctly by the receiver. Let $X$ be the amount of data carried in first segment (in Bytes). $Y$ be the Ack number sent by the receiver. The value of $X$ and $Y$ are :

(A) 120 and 870 (B) 120 and 990
(C) 750 and 990 (D) 120 and 750

**Q.42** What is the maximum size of data that the application Layer can pass on to the TCP Layer below?

(A) Any size
(B) $2^{16}$ B to Header size
(C) $2^{16}$ Byte
(D) 1500 Bytes

**Q.43** Packets of same session may be routed through different paths in.

(A) TCP but not UDP
(B) TCP and UDP
(C) UDP but not TCP
(D) Neither TCP nor UDP

**Q.44** Which of the following is a private address :

(A) 11.1.2.3 (B) 100.10.0.1
(C) 192.168.1.1 (D) 255.255.0.0

**Q.45** Trace route program is implemented using which concept(s) **[MSQ]**

(A) feedback messaging (ICMP)
(B) time to Live
(C) spanning tree
(D) None of these

**Q.46** In the checksum calculation at TCP, which of the following are used **[MSQ]**

(A) TCP header
(B) TCP data
(C) Pseudo header from IP
(D) None

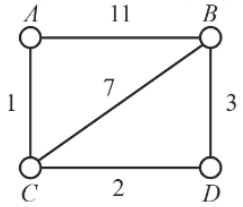
**Q.47** If '$k$' is the maximum number of bits available in sequence number field, then what is the maximum sender window size in GBN.

(A) $2^k - 1$ (B) $2^{k-1}$
(C) $2^k$ (D) $2^k + 1$

**Q.48** If Bandwidth of an Ethernet cable is 100 Mbps, distance of the LAN is 1 km, velocity of signal in cable is $2 * 10^8$ m/sec. Then what is minimum size of a frame in this Ethernet to detect collisions.

(A) 10, 000 bits
(B) 1000 bits
(C) 100 bits
(D) 10000 bytes

**Q.49** In the following graph, if DVR is applied, how many edges go unused?




(A) 1 (B) 2
(C) 3 (D) 4

**Q.50** If a Class B network is divide into Subnets and the Subnet mask is 255.255.192.0, then how many Subnets and hosts per Subnet are possible.

(A) $4, 2^{14}$ (B) 4,16
(C) 16,16 (D) $4, 2^{14} - 2$

**Q.51** In IPv4 packet format, the value of HLEN is 10 and offset value is 200. The total length of packet is 300 bytes. Find first and last byte number of payload/ data packet?

(A) 200, 460 (B) 200, 459
(C) 1600, 1860 (D) 1600, 1859

**Q.52** What will be the total number of host in a network with subnet mask 200.200.248.0 _____?

**Q.53** In a subnetted classful network with broadcast ID 200.156.76.95. What is the possible subnet mask in the same network?

(A) /24 (B) /25
(C) /26 (D) /27

**Q.54** Which of the following subnet mask can't be used if two host H(A): 200.145.75.155 and H(B): 200.145.75.162 belongs to the same network?

**[MSQ]**

(A) /25 (B) /26
(C) /27 (D) /28

**Q.55** Which of the following fields does not change while movement of IP-Packet?

**[MSQ]**

(A) Total Length
(B) Identification No.
(C) Protocol
(D) Checksum

**Q.56** Suppose an ISP needs to create 200 subnets, each with 200 usable host address per subnet. What network mask will you assign using a class B network address?

(A) 255.255.255.252
(B) 255.255.255.128
(C) 255.255.255.0
(D) 255.255.254.0

**Q.57** Which of the following fields of IP Header is/are definitely changed on visiting each router?

**[MSQ]**

(A) Checksum (B) TTL
(C) Offset (D) Total Length

**Q.58** Which of the following is NOT address resolution technique?

(A) BOOTP (B) DHCP
(C) ARP (D) RARP

**Q.59** Which of the following statement is FALSE regarding Distance Vector (DV) and Link State (LS) routing protocols?

**[MSQ]**

(A) In DV, every nodes share it's routing table with it's neighbor periodically.
(B) In LS, only one node builds it's own minimum spanning tree (MST).
(C) In DV, every node broadcast it's routing table to get distance of other.
(D) In LS, every node broadcast it's query message to get distance of other.

**Q.60** Suppose a Host(A) with IP-address 200.200.200.175 belongs to a network with subnet mask 255.255.255.63. What is the fourth octed of network ID in which Host(A) belongs_____?

**Q.61** Which of the following options is/are FALSE about Internet Protocol (IP)?

**[MSQ]**

(A) IP Packet from source to destination can take different route in the path.
(B) The checksum filed in IP Header help to detect error of IP Packet.
(C) The length of IP Packet remains same throughout it's journey.
(D) TTL inside IP Header prevents it to goes into infinite loop.

**Q.62** A IP Packet of size 1000 bytes is visiting to a router having maximum transmission unit (MTU) is 200 bytes. What is the maximum overhead inside IP Packet if size of network header is 40 bytes_____(Bytes)?

**Q.63** Suppose an ISP assigned a IP-address 200.200.200.200/24 to org-A. Now org-A wants to create a subnets of different number of addresses in each subnet.
Which one of the following assignment is NOT possible?
(A) 100, 50, 20, 25
(B) 60, 60, 60, 25, 10, 14
(C) 40, 40, 40, 20, 20, 10, 10
(D) 100, 60, 20, 10, 14

**Q.64** Suppose routers R1, R2….Rn are connected in a full binary tree form. Initially routers R1 only knows the distance of R2 and R3. Find number of updates required by distance vector routing protocol runs over R1 to get distance of router Rn?
(A) 1 (B) n-2
(C) Ceil(logn)-1 (D) floor(logn)-1

**Q.65** IP address with subnet is given as 200.200.200.103/28. Find last octed of broadcast ID in this network_____?

**Q.66** The subnet mask for a particular network is 255.255.248.0. Which of the following pair of IP-Address could belongs to this network?
(A) 200.156.128.17 & 200.156.132.18
(B) 200.156.128.17 & 200.157.130.18
(C) 200.156.128.17 & 200.156.136.18
(D) 200.156.128.17 & 200.156.135.18

**Q.67** What is the range of IP-addresses that can be assigned to the Hosts by IP address with subnet mask:
200.200.200.200/27?
(A) 200.200.200.129
to 200.200.200.190
(B) 200.200.200.160
to 200.200.200.254
(C) 200.200.200.1
to 200.200.200.254
(D) 200.200.200.193
to 200.200.200.222

**Q.68** Suppose Host A wants to send a packet of size 5020 bytes at network layer to Host B. The maximum transmission unit (MTU) of underlying layer of Host A is 1420 bytes. If size of header at network layer is 20 bytes, Suppose number of fragments are x and offset field value of 3rd fragment is y. Then find the value of xy that Host B will receive_____?

**Q.69** Suppose an organization wants to create sub-network containing 35,20,15 hosts in each sub-networks. What is the maximum length of subnet mask that organization should use?
(A) /22 (B) /24
(C) /25 (D) /26

**Q.70** What is the maximum length of subnet mask if two host belongs to the same network
Host A: 200.200.200.97
Host B: 200.200.200.110
(A) /24 (B) /25
C) /27 (D) /28

**Q.71** The transport layer passes a packet size of 4228 to networks layer. The size of header at network layer is 20 bytes and maximum transmission unit (MTU) at underlying layer (DDL) is 1420 bytes. Which of the following options is/are TRUE? **[MSQ]**
(A) Number of fragments are 3
(B) Offset value of last fragment at IPv4 packet is 350?
(C) Size of last fragmented IP packet is 28 bytes.
(D) Sum of offset value of all fragments is 1050.

**Q.72** Which of the following statements is / are FALSE?

$S_1$: TCP Provides end to end connection.

$S_2$: TCP ensures that data is delivered reliably in sequence and without error.

(A) $S_1$ Only

(B) $S_2$ Only

(C) Both $S_1$ & $S_2$

(D) Neither $S_1$ and $S_2$

**Q.73** In TCP, sequence number is used for

(A) Rearranging the data of receiver end before passing to the application.

(B) Detecting duplicate data

(C) Both

(D) None of these.

**Q.74** Which of the following statements is FALSE about TCP?

(A) It uses sequence number field for in order delivery of data segments

(B) It is connection oriented protocols so all packets follow same path.

(C) It is responsible for end to end delivery of data segments

(D) It is used in an application in which reliability is must.

**Q.75** Which of the following is NOT part of UDP header?

(A) Checksum

(B) Source Port

(C) Sequence Number

(D) Total Length

**Q.76** Which of the following statement is NOT True?

(A) TCP assigns sequence number to each byte

(B) TCP assign sequence number only to the first byte of segment

(C) TCP uses 32- bits for sequence number field.

(D) Byte numbering is used for flow control

**Q.77** Consider following assertion:-

S1: TCP connection establishment is the three-way handshaking process

S2: TCP Connection termination is two-way handshaking process

Which of above assertions are true?

(A) S1 only (B) S2 only

(C) Both (D) None

**Q.78** Which of the following field is NOT included in TCP Header?

(A) Sequence Number

(B) Acknowledgement Number

(C) Checksum

(D) Protocol

**Q.79** Consider the following assertions:-

S1: TCP uses checksum field for error control

S2: TCP uses sequence number field for flow control

S3: TCP window size is varying depending upon congestion of networks.

Which of the following is/are TRUE?

(A) S1, S2 (B) S2, S3

(C) S1, S3 (D) All

**Q.80** Suppose size of receiver window is 20KB and size of congestion window is 10KB. What should be the size of sender window to maintain flow control?

(A) 30KB

(B) 20KB

(C) 10KB

(D) Could be 10KB or 20KB

**Q.81** Suppose size of current window of sender is 2MSS (Maximum segment size) and sender is using Slow Start congestion control protocol. If threshold value of networks is 8MSS then find the sender window size after 5 RTT_____?

**Q.82** Suppose size of each segment is 2000 bytes and current sender window size is 6000 bytes. Sender received three ACK subsequently then what is the sender window size if Slow Start protocol is used?

(A) 6000 byes
(B) 8000 bytes
(C) 10000 bytes
(D) 12000 bytes

**Q.83** Initially sender detected that size of receiver window is 6 MSS and congestion window size is 4 MSS. After one RTT, what will be the sender window size if Slow Start protocol is used_____ (in MSS)?

**Q.84** Which of the following statements is/are TRUE about UDP?

S1: It uses three way handshaking process to established connection.
S2: Header size of UDP packet is fixed and of 8 bytes.
S3: It is used for application layer where reliability is not required.

A) S1, S2 B) S3
C) S2, S3 D) All

**Q.85** What is the maximum transmission time required to transmit a single UDP packet if channel bandwidth is 10 Mbps_____(in ms)?

**Q.86** In Go-back-3 flow control protocol every $5^{th}$ packet is lost. If we have send 11 packets. _____ transmissions will be needed?

**Q.87** Consider a scenario with two hosts, *X* and *Y*. A web server running on *X* is trying to send data to a browser on *Y*. For each TCP connection, *X*'s TCP stack maintains a buffer of 1024 bytes and *Y*'s TCP stack maintains a buffer of 2048 bytes. For simplicity assume TCP sequence number began at '0'. *Y*'s stack received upto byte 1084 in order from *X*, although its browser has only read up to the first 40 bytes. The window size in the TCP headers that *Y* next sends to *X* is _____ Bytes.

**Q.88** Suppose sender is using sliding window protocol with propagation delay of 25 ms. If frame size is 1000- bits and bottleneck bandwidth is 1 Mbps then what should be the sender window size of channel efficiency of 80 %?

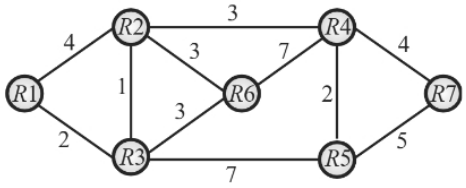
**Q.89** Suppose sender is transmitting data with data rate of 20 Mbps. What is the link utilization (in percentage) if throughout of channel is 5 Mbps.

(A) 100 (B) 75
(C) 50 (D) 25

**Q.90** Suppose sender is using stop and wait protocol with round trip delay of 30 ms. If frame size is 1000 bits and transmission rate is 1 Mbps then what is the link utilization (roundoff to two decimal places) assuming processing delay of 0.75 ms and acknowledgement transmission time 1.25 ms?

**Q.91** Suppose two stations sharing a common medium involves in collision four times. What is the probability of success in next transmission by any one of them? (Round off to two decimal places)

**Q.92** Consider following network implementing Distance vector routing :-




After route stabilization, how many links remains unused _____?

**Q.93** Two stations 'A' and 'B' are on a Ethernet. Both A and B attempt to transmit their frames, collide, and 'A' wins first backoff race. At the end of successful transmission by 'A', again both attempts to transmit and collide. The probability that either A or B wins next backoff race is.

(A) 0.625 (B) 0.5
(C) 0.75 (D) 1

**Q.94** Consider the cyclic redundancy check (CRC) based error detecting scheme having CRC generating polynomial is $x^4+x^2+x+1$. Suppose the data 100110 is to be transmitted. Check bits $C_3C_2C_1C_0$ are appended at the end of the data by the transmitter using the above CRC scheme. The decimal value of the code word is_____(consider unsigned value).

**Q.95** A block of addresses is granted to a small origanization. If one of the addresses is 210.32. 64.79/26, then which of the following is/are True?

**[MSQ]**

(A) First address is 210.32.64.64
(B) Last address is 210.32.64.127
(C) Subnet mask is 255.255.255.192
(D) Total number of IP address is 64

**Q.96** Suppose an 1P – packet is created by source host having HLEN =12. How many record route address can be placed inside header of 1P- packet?

**Q.97** In CSMA/CD propagation time is 1 msec and bandwidth is 10 Mbps then what should be the packet minimum length to detect the collision.

(A) 250 bytes
(B) 400 bytes
(C) 2500 bytes
(D) 325 bytes

**Q.98** In the IPV4 addressing format, the number of networks allowed under class C addresses is ____

**Q.99** In go back 5, if every 7th packet that is being transmitted is loss and if we have to send 10 packets, then how many transmissions are required_____.

**Q.100** 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 42 bytes and each packet contain a header of 6 bytes, then the optimum packet size is

(A) 8 (B) 10
(C) 14 (D) 12

**Q.101** An IP address is 120.140.5.128/22 it is the____ IP address of the block.

## Answers Computer Network

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | B | 2. | B | 3. | C | 4. | 5.36 | 5. | C |
| 6. | C | 7. | D | 8. | B | 9. | D | 10. | A |
| 11. | B | 12. | A,B,D | 13. | C | 14. | C | 15. | B |
| 16. | D | 17. | D | 18. | D | 19. | 2 | 20. | C |
| 21. | A | 22. | D | 23. | A | 24. | B | 25. | 10000000 |
| 26. | B | 27. | D | 28. | A,B,C | 29. | D | 30 | B |
| 31. | A | 32. | B | 33. | B | 34. | B | 35. | A |
| 36. | B | 37. | D | 38. | A | 39. | D | 40 | C |
| 41. | D | 42. | A | 43. | B | 44. | C | 45. | A,B |
| 46. | A,B,C | 47. | A | 48. | B | 49. | B | 50. | D |
| 51. | D | 52. | 2046 | 53. | D | 54. | C,D | 55. | B,C |
| 56. | C | 57. | A,B | 58. | B | 59. | B,C | 60. | 47 |
| 61. | B,C | 62. | 240 | 63. | C | 64. | D | 65. | 111 |
| 66. | C | 67. | D | 68. | 4350 | 69. | C | 70. | D |
| 71. | C,D | 72. | A | 73. | A | 74. | B | 75. | C |
| 76. | B | 77. | A | 78. | D | 79. | D | 80. | C |
| 81. | 11 | 82. | D | 83. | 4 | 84. | C | 85. | 52.4 |
| 86. | 20 | 87. | 1004 | 88. | 40 | 89. | D | 90. | 0.03 |
| 91. | 0.94 | 92. | 3 | 93. | C | 94. | 609 | 95. | A,B,C,D |
| 96. | 6 | 97. | C | 98. | * | 99. | 14 | 100. | C |
| 101. | 384 | | | | | | | | |

**1. (B)**

1. Network Layer take of feedback messaging through ICMP.
2. Application Layer sends data of any size to transport Layer. Now transport layer will know the MTU of the network, so it will segment the data into smaller parts and these segments are reassembled at the transport Layer of the receiver. So, Transport Layer taken care of Segmentation and Reassembly.
3. When more than one system is connected to a shared Link, Data Link Layer protocols are required to determine which device has the control over the link at a given time. It is implemented by Protocols Like CSMA/CD, CSMA/CD, CSMA/CA, ALOHA and Token Passing
4. Dialogue Control is using the full duplex link as half duplex. It sends out dummy packets from the client to the server when the client in ideal. This is done by the session Layer.
5. Presentation Layer translates a message from common form to encoded format which will be understood by the receiver.
6. Physical Layer chooses which type of transmission mode is to be selected for the transmission. The transmission modes are simplex, Half Duplex and Full duplex.

Hence, the correct option is (B).

**2. (B)**

Throughput of Pure Aloha $= G * e^{-2G}$ Where $G$ is the average number of frames generated by the system during one frame Transmission time.

The maximum throughput is achieved when $G = \frac{1}{2}$. So, maximum through put $= 0.5 \times e^{-1} = 0.184$

This is the maximum utilization of the band width.

Therefore total utilization of bandwidth $= 0.184 *$ Bandwidth of channel

Number of stations $*$ Capacity of each station $= 0.184 *$ Capacity of channel

$N * b = 0.184 * B$

$N = 0.184 * B/b$

Given channel capacity is $B$

$= 48$ kbps $= 48 * 1000$ bps

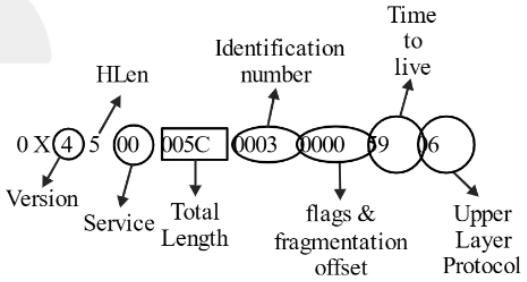
Capacity of each station is $b = 1024$ bits/50 sec $= 20.48$ bps

$\Rightarrow \quad N = 0.184 * 48 * 1000$ bps/20.48 bps

$= 431$

Hence, the correct option is (B).

**3. (C)**




From the above figure, the time to live (TTL) field is $0 \times 59$ in Hexadecimal $= 5 * 16 + 9 = 89$ in decimal. Therefore, the packet will be dropped after taking 89 hopes from the source.

Hence, the correct option is (C).

**4. 5.36**

Given $B = 8$ Mbps

Ring latency or propagation delay $= 256$ µsec

Length of the frames $= 1024$ B

Number of stations $N = 1$

Given that token is held until the frame reaches the source and then releases the token.

So, this is delayed token reinsertion strategy.

$$\eta = \frac{N}{N + (N+1)a},$$

Where, $a = \dfrac{\text{Propagation delay}}{\text{Transmission delay}}$

$$T_{trans} = \frac{L}{B} = \frac{1024 * 8 \text{ bits}}{8 \times 10^6 \text{ bits}} = 1024 \text{ µsec}$$

$$a = \frac{T_p}{T_t} = \frac{256 \text{ µs}}{1024 \text{ µs}} = 0.25$$

$$\eta = \frac{1}{1 + (1+1)0.25} = 0.67$$

Therefore Effective data rate = Efficiency * Bandwidth

$= 0.67 * 8 \text{ Mbps} = 5.36 \text{ Mbps}$

Hence, the correct answer is 5.36.

**5. (C)**

The HLEN value is 15, which means the total number of bytes in the header is $15 * 4 = 60$ bytes. Given the total length is $0 \times 0064$ in hexadecimal $= 100$ bytes including header size. So, the data carried by this Packet = total length – header length $= 100 - 60 = 40$ bytes

Hence, the correct option is (C).

**6. (C)**

*M* bit is 0, means this datagram is the last fragment, there are no datagram after this offset is 800 i.e., there are $800 * 8$ bytes $= 6400$ bytes before this fragment.

Total Length field is 500 bytes.

Given HLEN is 8, So header Length is $8 * 4 = 32$ bytes.

Therefore the data present in this fragment is $500 - 32 = 468$ Bytes.

The sequence number of the first byte of this fragment is 6400, since there are 6400 bytes, before this datagram and sequence number starts from 0. The sequence number of the last byte of this fragment is $6400 + 468 * 1 = 6867$

Hence, the correct option is (C).

**7. (D)**

Propagation delay $= 0.5$ sec

RTT $= 2 \times 0.5 = 1$ sec, $B = 4$ Mbps, $L = 2$ kB

$$T_{trans} = \frac{L}{B} = \frac{2 * 1024 \times 8 \text{ bits}}{4 \times 10^6 \text{ b/sec}}$$

$$= 4.096 * 10^{-3} \text{ sec}$$

Window size

$$= \frac{T_{trans} + 2 * T_{prop}}{T_{trans}}$$

$$= \frac{(4.096 \times 10^{-3}) + (1000 \times 10^{-3})}{4.096 \times 10^{-3}} = 245.14$$

Therefore, number of sequence bits

$$= \lceil \log_2 W_5 \rceil = \lceil 245.14 \rceil = 8$$

Hence, the correct option is (D).

**8. (B)**

UDP header is 64 bits has parts each containing 16 bits.

1st 16 bits for source port number

2nd 16 bits for destination port number

3rd 16 bits for total length

Last 16 bits for Checksum.

Given header is $5EFA00FD001C3297$ in hexadecimal form. $0 \times 5EFA$ is source port number and the value is 24, 314 in decimal

$0 \times 00FD$ is destination port number and the value is 253 in decimal

$0 \times 001C$ is for total length

$0 \times 3297$ is for checksum.

Datagram total length is $001C$ H bytes which is 28 bytes.

Now if port value is > 1023 then it's a client and if < 1023 then it's server.
Clearly source port number is $5EFA$ H which is 24314 > 1023. So it's a client.
Destination port number is $00FDH$ i.e. 253 < 1023.
So it's a server. So, packet is going from client to server.
Hence, the correct option is (B).

**9. (D)**

(Given size of TCP segment
$= 1 \text{ kB} = 1024 \text{ Bytes}$
Header length field is 6, so header size
$= 6 * 4 = 24$ bytes
Total data size = Size of segment – Header size
$= 1024 - 24 = 1000$ bytes of data
Starting sequence number is 3500
So the range of sequence number of the data is 3500 to 4499
URG pointer $= 45$ so data from $0^{th}$ byte till $45^{th}$ byte are urgent So 46 bytes are urgent data.
Therefore, the urgent data is 1000 to 1045 and its sequence number range is 3500 – 3545.
Hence, the correct option is (D).

**10. (A)**

For every 2 secs, counter is incremented by 2, 56, 000
So for every 1 sec, counter increments by $\frac{2,56,000}{2} = 1,28,000$
The sequence number is 32 bit long and it can hold only $2^{32} - 1$.
So, it takes $\frac{(2^{32}-1)}{(128000)} = 33,554,431$ sec.
Hence, the correct option is (A).

**11. (B)**

From the Jacobson's algorithm,
Next Deviation

$$D_N = |\text{IRTT} - \text{NRTT}| = |45 - 60| \text{ sec}$$
$$= 15 \text{ sec}$$

Expected deviation $D_E = \alpha D_I + (1-\alpha) D_N$
$= 0.9 * 8 + 0.1 * 15$
$- 8.7$
Expected Roundtrip time ERTT
$= \alpha * \text{IRTT} + (1-\alpha)\,\text{NRTT}$
$= 0.9 * 45 + (1 - 0.9) * 60$
$= 46.5$
Time out $T_0 = \text{ERTT} + 4 * D_E$
$= 46.5 + 4 * 8.7$
$= 81.3$
Hence, the correct option is (B).

**12. (A,B,D)**

TCP connections are end to end. Data Link Layer is Link to Link.
Hence, the correct option are (A,B,D).

**13. (C)**

IP datagram identification number space is 16 bits.
So number of packets $= 2^{16}$
Packet life time $= 15$ sec
So, $2^{16}$ packets will be sent in 15 secs
In 1 second, $\frac{2^{16}}{15}$ will be sent
Since each packet size $= 16$ k bits $= 2$ k Bytes
So line speed $= \frac{2^{16} * 2048 \text{ byte}}{15 \text{ sec}} = 8.533$ MBps
Hence, the correct option is (C).

**14. (C)**

Bandwidth $B = 512$ Mbps $= 512 * 10^6$ bits/sec
Distance $d = 2$ km
Speed $= 2 \times 10^8$ m/s
For CSMA-CD, to detect collision, $T_t \geq 2T_p$

$$T_p = \frac{d}{V} = \frac{2\times10^3 \text{ m}}{2\times10^8 \text{ m/s}} = 10^{-5} \text{ sec}$$

$$T_t = \frac{L}{B} = \frac{L}{512*10^6 \text{ b/s}}$$

$$L = 2*10^{-5} \text{ sec} \times 512\times10^6 \text{ bits/sec}$$

$$L = 1024\times10 \text{ bits} = 128\times10 \text{ bytes}$$

$$L = 1280 \text{ bytes}$$

Hence, the correct option is (C).

**15. (B)**

$$\eta = \frac{W}{1+2a} \qquad a = \frac{T_p}{T_t}$$

$$\eta = \frac{W*T_{trans}}{T_{trans}+2*T_p} \Rightarrow \frac{1}{2} = \frac{W*T_{trans}}{T_{trans}+2T_p}$$

$$L = 2*B*\frac{T_{prop}}{(2W-1)}$$

$$T_p = \frac{d}{V} = \frac{72*10^6 \text{ m}}{3\times10^8 \text{ m/sec}} = 0.24 \text{ sec}$$

Therefore,

$$L = 2*\frac{(10*10^6 \text{ bits/sec})*(0.24 \text{ sec})}{(2*100-1)}$$

$$= 3015 \text{ bytes}$$

Hence, the correct option is (B).

**16. (D)**

Given time $= 30$ sec

$B = 500$ Mbps

1 sec $= 500$ Mb

$$30 \text{ sec} \rightarrow 30*500*\frac{10^6}{8 \text{ bytes}} = 1.875*10^9$$

Number of bits required to avoid wrap around

$$= \left\lceil \text{Log}_2(1.875*10^9) \right\rceil \text{ bits} = 31$$

Hence, the correct option is (D).

**17. (D)**

Given

$B = 250$ Mbps, $RL = 120$ µsec, $L = 5000$ bits

Number of hots present is $N$.

In early token reinsertion Efficiency

$$= N*\frac{T_{trans}}{NT_{trans}+RL}$$

$$T_{trans} = \frac{L}{B} = \frac{5000 \text{ bits}}{250*10^6 \text{ bits/s}} = 20 \text{ µs}$$

$$\text{Efficiency} = \frac{20N}{N*20+120} = \frac{N}{N+6}$$

Hence, the correct option is (D).

**18. (D)**

Given $B = 48$ Mbps

Token Holding Time (THT) $= 5$ ms

In token ring, minimum frame size can be anything since there are no collisions. So, it is applicable to interactive applications. In order to avoid monopolization there is a limit on the time for which a station should hold a token, Token Holding Time (THT)

Therefore max frame size $= B*T$

$= 48$ Mbps $*5$ ms $= 240000$ bits

$= 30000$ bytes

Data size or payload = frame size – 21

$= 29979$ bytes

Hence, the correct option is (D).

**19. 2**

Since, the flag pattern used as 01111.

And, transmitted data is 101110100111001101

In transmitted data we have stuff bits after every 0111.

10111$\boxed{0}$100111$\boxed{0}$01101

So, number of stuff bits = 2

Hence, the correct answer is 2.

**20. (C)**

Given slow start congestion protocol, so size of the sender window starts from 1 MSS and increase exponentially.

So, for the 1st transmission, 1 MSS $= 1 * 1460$

2nd transmission, 2 MSS $= 2 * 1460$

3rd transmission, 4 MSS $= 4 * 1460$

$\vdots$

$N^{th}$ transmission, $N$ MSS $= N * 1460$

Sum of all the data send in $N$ transmission should be equal to 1000 KB

$$1460(1+2+4+8+\ldots+N)\text{ Bytes} = 1000\text{ KB}$$

$$1+2+4+8+\ldots+N = \frac{1024000\text{ B}}{1460\text{ B}} = 701.369$$

It is in Geometric progression so sum of $N$ terms in G.P is

$$\frac{1(2^N-1)}{2-1} = 701.369$$

$$2^N - 1 = 701.369$$

$$2^N = 702 \text{ (approx)}$$

$$\Rightarrow \quad N = \lceil \text{Log}_2 702 \rceil = 10$$

So we need to transmit 10 times to send all the 1000 KB data file.

Therefore we need 10 RTT time

$$10 * 100\text{ ms} \rightarrow 1000\text{ KB}$$

$$1\text{ sec} \rightarrow \frac{1000\text{ KB}}{1000\text{ ms}} = 1\text{ Mbps}$$

Hence, the correct option is (C).

**21. (A)**

Given address is class B, we need 512 Subnets so we require 9 bits to be borrowed from host id i.e., 8 bits from 3rd Octet and 1 bit from 4th Octet.

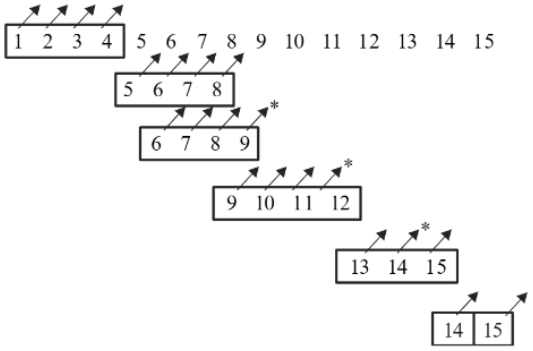
So, the Subnet mask is 255.255.255.128

Hence, the correct option is (A).

**22. (D)**

**23. (A)**

**24. (B)**




Total number of transmissions required to send message = 21

Hence, the correct option is (B).

**25. 10000000**

$$L_{\min} = R \times 2t_p$$

$$= 1 \times 10^9 \text{ bits/sec} \times 2 \times \frac{10^3 \text{ meter}}{200 \times 10^3 \text{ met/sec}}$$

$$= 10^7 \text{ bits}$$

Hence, the correct answer is 1000000.

**26. (B)**

$$L = 100\text{ bytes}$$

$$t_p = 400\text{ sec},\ R = 25\text{ kbps}\ N = 8$$

$$R_E = \eta.R$$

$$t_t = \frac{L}{R} = \frac{100 \times 8}{25 \times 10^3} = 32\text{ ms}$$

$$\text{(maximum bandwidth utilization)} = \frac{N.t_t.R}{t_t + 2t_p}$$

$$= \frac{8 \times 32}{32 + 2 \times 400} \times 25\text{ kbps}$$

$$= \frac{256}{832} \times 25\text{ kpbs} \simeq 7.7\text{ kbps}$$

Hence, the correct option is (B).

**27. (D)**

$$\eta = \frac{t_t}{t_t + 2t_p};\quad t_t = \frac{L}{R},\ t_p = 20\text{ ms}$$

$$75\% = \frac{\frac{L}{R}}{\frac{L}{R} + 2 \times 20\text{ ms}} \Rightarrow 4L = 3L + 160\text{ bits}$$

$$\Rightarrow \quad \frac{3}{4}=\frac{L}{L+2\times 20\times 10^{-3}\times 4\times 10^{3}} \text{ bits}$$

$$\Rightarrow \quad L=160 \text{ bits}$$

Hence, the correct option is (D).

**28. (A,B,C)**

**29. (D)**

A- (iii)
B- (ii)
C- (iv)
D- (i)
E- (v)

Hence, the correct option is (D).

**30. (B)**

(A) $\dfrac{201.201.201.1001}{\text{masked by/28}}\Big| \overset{1111}{\Longleftrightarrow}$ all 1s ,

so broadcast id

(B) $\dfrac{201.201.201.1100}{\text{masked by/28}}\Big| \overset{0111}{\Longleftrightarrow}$ not all 1s,

so not a broadcast id

(C) $\dfrac{201.201.201.1100}{\text{masked by/28}}\Big| \overset{1111}{\Longleftrightarrow}$ all 1s ,

so broadcast id

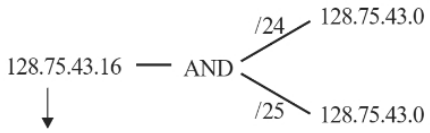
(D) $\dfrac{201.201.201.1000}{\text{masked by/28}}\Big| \overset{1111}{\Longleftrightarrow}$ all 1s ,

so broadcast id

Hence option (B) is true.

Hence, the correct option is (B).

**31. (A)**




It will be forwarded through interface having longest mask matched

So,

| /25 | Eth1 |
|---|---|

$$192.12.17.10 \xrightarrow[/32]{AND} 192.12.17.10$$

$$\downarrow$$

So by defaut network – Eth 3

Hence, the correct option is (A).

**32. (B)**

Subnet mask = /22

$$\left.\begin{matrix}10.35.28.2 \text{ AND/22= } 10.35.28.0\\ 10.35.29.4 \text{ AND /22=10.35.28.0}\end{matrix}\right\} \text{Same Net} - 1\text{D}$$

So, both the host belongs to same network.

Hence, the correct option is (B).

**33. (B)**

Since, in a spanning tree, there is a unique path from a source to the destination, which avoids loops, since it is a tree, and contains all the nodes, since it is a spanning tree.

Hence, the correct option is (B).

**34. (B)**

**35. (A)**

$d=3000 \text{ km}\ \ R=1.536 \text{ Mbps}$

$h=64 \text{ Bytes, Speed }=8 \text{ km/sec}$

$$t_p=\frac{d}{\text{speed}}=\frac{3000\times 10^{-6}}{8}\text{ sec}$$

$$t_p=375\,\text{ms}$$

$$t_f=\frac{64\times 8}{1.536\times 10^{6}}\text{ sec}$$

$$t_f=\frac{256}{1.536}\text{ ms}=166\,\text{ms}$$

We know,

$$N\le\frac{t_t+2t_p}{t_t}\text{, for max utilization}$$

$$N\le\frac{167+2\times 375}{167}$$

$$N\simeq 5$$

So, sequence No. bits $=[\log_2 N]=[\log_2 5]=3$

Hence, the correct option is (A).

**36. (B)**

$$RTT = 2t_p = 2\times 2\times 60\,\text{sec} = \frac{2\,\text{KB}}{R}$$

$$R = \frac{2\times 1024\times 8\ \text{bits}}{4\times 60\ \text{sec}}$$

$$R = 68.2\,\text{bps}$$

Hence, the correct option is (B).

**37. (D)**

For the subnet mask N = 255.255.255.22 both the host belongs to different network

Hence, the correct option is (D).

**38. (A)**

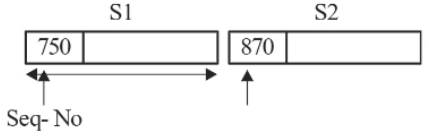
**39. (D)**

Count to infinity problem is associated with only DV and it requires lesser no. of network message in compare to LS, as LS uses flood: technique to get distance of other.

Hence, the correct option is (D).

**40. (C)**

**41. (D)**




Size of segment = 120 byte

Since 1st segment is lost

So, Ack- No $(Y) = 120$

Hence, the correct option is (D).

**42. (A)**

Its transport layers responsibility to divide data in to fragments/ packets. Application layer need not worry about it.

Hence, the correct option is (A).

**43. (B)**

As path is decided by routing protocols.

Hence, the correct option is (B).

**44. (C)**

192.168.1.1 is a private address in class C

Hence, the correct option is (C).

**45. (A,B)**

**46. (A,B,C)**

**47. (A)**

In GBN, $SW < 2^k$

So, $(SW)_{\max} = 2^k - 1$

Hence, the correct option is (A).

**48. (B)**

$$T_{trans} \geq 2 * T_{prop}$$

$$\frac{L}{B} \geq 2 * \frac{d}{v}$$

$$\Rightarrow \quad L = 2 * \frac{d}{v} * B = \frac{2*1000}{2*10^8} * 100 * 10^6$$

$$= 1000 \text{ bits}$$

Hence, the correct option is (B).

**49. (B)**

The edges $AB$ and $CB$ will not be used. If we consider the edge $AB$, there is a shorter path than $AB$.

It is $A \to C \to D \to B$

Similarly, for $CB$, better path is $C$-$D$-$B$

Hence, the correct option is (B).

**50. (D)**

Numbers of 1's = NID + SID

In class $B$, NID = 16

255.255.192.0

= 11111111.11111111.11000000.00000000

$\therefore$ 1's = 18

18 = NID + SID

$\rightarrow$ 16 + SID = 18 $\rightarrow$ SID = 2

$\therefore$ Number of Subnets $= 2^2 = 4$

Number of 0's in Sm indicates HID part,

In the Sm given, number of 0's = 14

Hence, the correct option is (D).

**51. (D)**

HLEN field value $= 10$

So, actual header length $= 10 \times 4 = 10 \times 4$

$= 40$ bytes

Offset $= 200$

$TL = 300$

So, Payload size $= TL -$ Header length

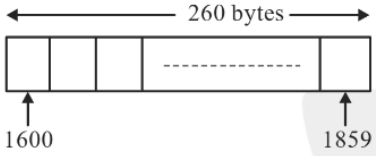
$= 300 - 40 = 260$

1st byte Number $= 8 \times$ offset $= 8 \times 200 = 1600$

Last byte Number $= (1600 + 260) - 1$

{Since starting from '0'}

$= 1859$




Hence, the correct option is (D).

**52. 2046**

Subnet mask $= 255.255.248.0$

$= /21$

So, number of host $= 2^{32-21} - 2$

$= 2^{11} - 2$

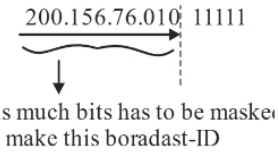
$= 2048 - 2$

$= 2046$

Hence, the correct answer is 2046.

**53. (D)**

Broadcast-ID $= 200.156.76.95$




So, possible Subnet mask $= /27$

Hence, the correct option is (D).

**54. (C,D)**

$H_A : 200.145.75.155$

$H_B : 200.145.75.162$

AND

AND

/27

/27

Net-ID $= 200.145.75.128$

$= 200.145.75.160$

Since Host 'A' and 'B' have different Subnet-ID for Subnet mask /27. So belongs to differential network.

Some thing will happen for Subnet mask $= /28$

Hence, the correct option are (C,D).

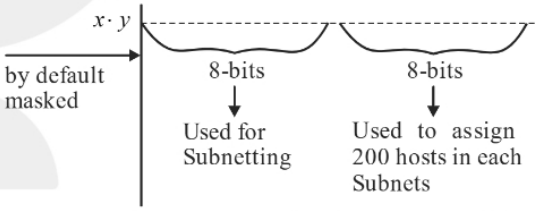
**55. (B,C)**

Identification no and protocol set by source node never changed during the movement of IP-packet.

Hence, the correct option are (B,C).

**56. (C)**

In Class-B, we have 16-bits accessible remaining 16-bits are fixed by ISP.




So, we need to consume 8-bits from host-ID to create 200 Subnets.

So, Subnet mask $= /16 + 8 = /24$

$/24 = 255.255.255.0$

Hence, the correct option is (C).

**57. (A,B)**

Offset and Total length field are only changed whenever fragmentation is done by router.

Hence, the correct option are (A,B).

**58. (B)**

DHCP is used to dynamically allocate IP-address in wireless network. It is not Address resolution technique.

Hence, the correct option is (B).

**59. (B,C)**

Option (C) is false, because every node only shares its routing table to its neighbors.

Option (B) is false, because every nodes creates their own MST.

Hence, the correct option are (B,C).

**60. 47**

Host-ID = 200.200.200.175

Subnet mask = 255.255.255.63 AND (bitwise)

Net-ID = 200.200.200.47

Fourth octed of Net-ID

Hence, the correct answer is 47.

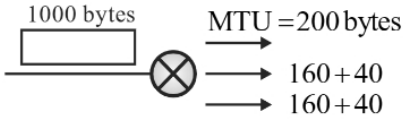
**61. (B,C)**

Checksum field only defect error inside header not data

Length will differ when fragmentation occurs

Hence, the correct option are (B,C).

**62. 240**




Header size = 40 byte

Payload size = 200 – 40 = 160

No. of fragment $= \frac{1000-40}{160} = 6$

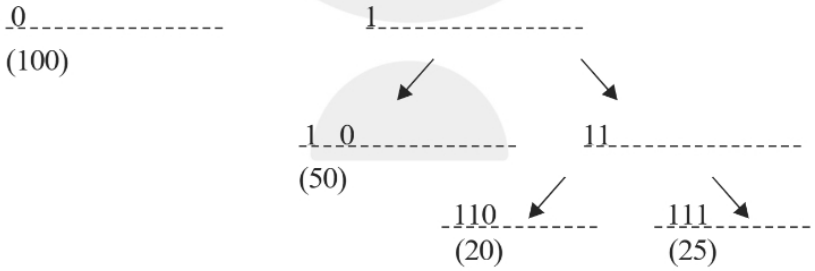
So, Oren bead $= 6 \times 40 = 240$ byte

Hence, the correct answer is 240.

**63. (C)**

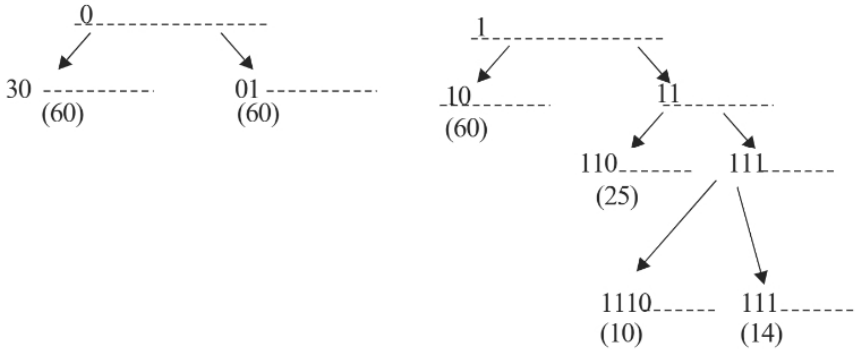
Since host bits = 8, Lets start fixing the bits one by one for the last octet starting from left to right.

(A)



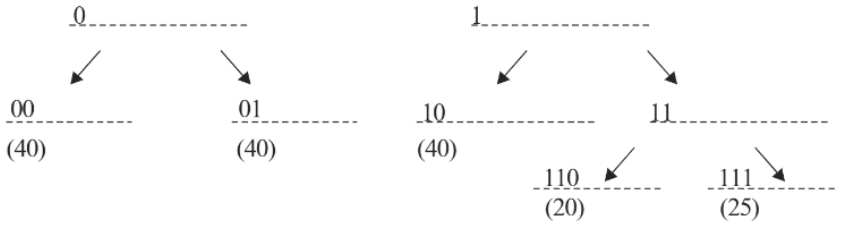

Hence A is possible

(B)




Hence B is possible

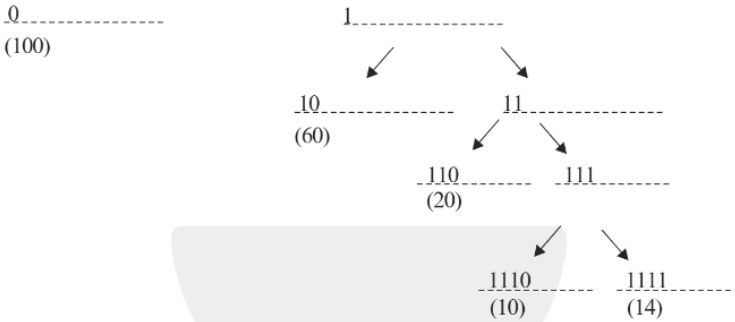
(C)




10,10 are left

Hence C is not possible

(D)




Hence D is possible

Only C is not possible

Hence, the correct option is (C).

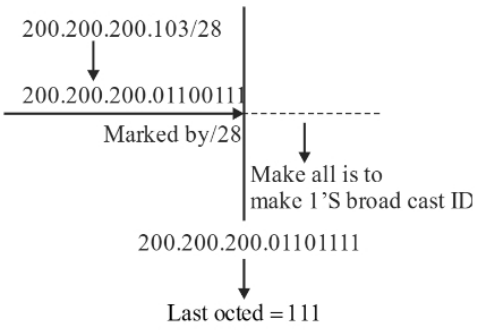
**64. (D)**

So, no. of up data required to get distance $=\lceil \log n' - 1 \rceil$

**Note :** Just imagine 7 – node no. of updata required is 1.

Hence, the correct option is (D).

**65. 111**




Hence, the correct answer is 111.

**66. (C)**

Subnet mask = 255.255.248.0

Take Subnet Mask and do AND operation with pair of IP address and if Net ID is same then they belong to same network.

Hence, the correct option is (C).

**67. (D)**

200.200.200.200 / 27

Net ID = IP AND /27

= 200.200.200.200. AND/27

= 200.200.200.192

$= 200.200.200, \underline{1}\,\underline{1}\,\underline{0}\,\frac{0}{0}\,\frac{0}{0}\,\frac{0}{0}\,\frac{0}{0}\,\frac{0}{1}$

Masked by /27

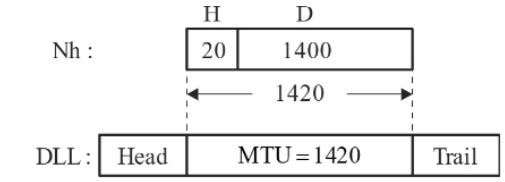
Host range $\frac{1}{1}\,\frac{1}{1}\,\frac{1}{1}\,\frac{1}{1}\,\frac{0}{1}$

So, Range of host IP

$= 200.200.200.193$ to
$200.200.200.222$

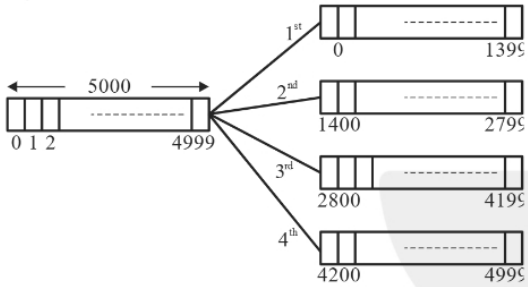
Hence, the correct option is (D).

**68. 4350**




IP packet size = 5020

Payload $= 5020 - 20 = 5000$




Fragment $= 4 (x = 4)$

Offset of 3rd fragment $= \frac{2800}{8} = 350$

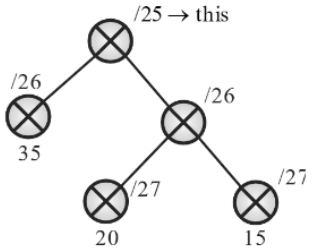
So, $xy = 4350$

Hence, the correct answer is 4350.

**69. (C)**

Subnets container no. of Host $= 35, 20, 15$

This is the possible subnet mask.




Hence, the correct option is (C).

**70. (D)**

$H_A = 200.200.200.97$

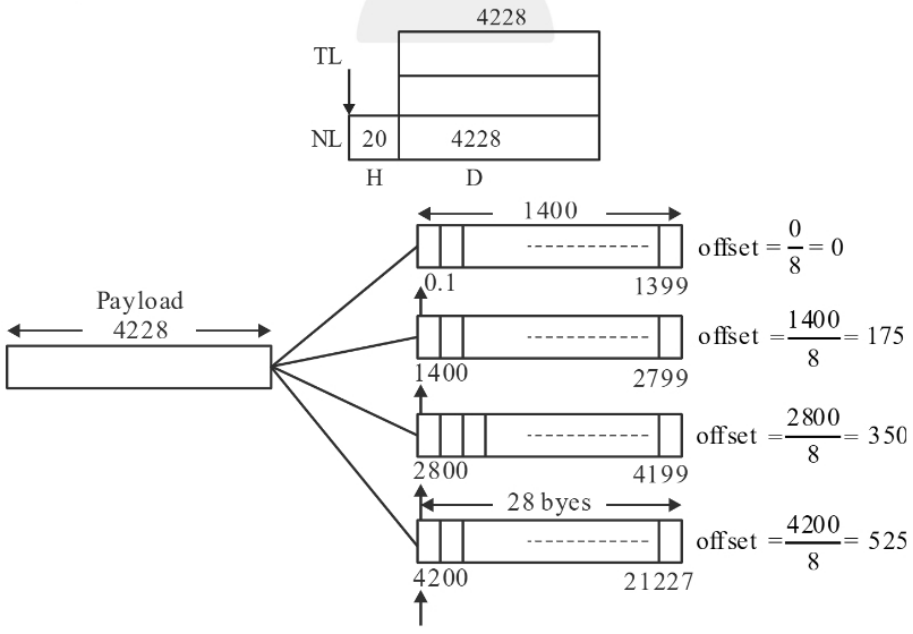
$H_B = 200.200.200.110$

For the subnet mask /24, / 25/, / 27, / 28 these hosts belongs to the same network.

So, max$^m$ subnet mask possible is = /28.

Hence, the correct option is (D).

**71. (C,D)**



Size of last fragment = 28 byte

Sum of offsets of all fragments $= 0+175+350+525 = 1050$

Hence, the correct option are (C,D).

**72. (A)**

Only SI is correct so ans. (A)

Hence, the correct option is (A).

**73. (A)**

Seq. No. in TCP is assigned to each byte of segment & it helps to identify whether segment are reaching in order or not.

Hence, the correct option is (A).

**74. (B)**

TCP only provide end to end communication. Routes of packets are decided by underlying dyer

Hence, the correct option is (B).

**75. (C)**

Sequence no. is associated with TCP header not UDP.

Hence, the correct option is (C).

**76. (B)**

Option (B) is not true, because sequence no. is assigned to each byte of segment.

Hence, the correct option is (B).

**77. (A)**

Statement SI is only is only correct because connection establishment is a three-way handshaking process.

Hence, the correct option is (A).

**78. (D)**

Protocol is not included in TCP Header.

Hence, the correct option is (D).

**79. (D)**

All are True.

Hence, the correct option is (D).

**80. (C)**

Sender window size $= \min(rwnd, cwnd)$

$= \min(20,10)$

$= 10$ KB

Hence, the correct option is (C).

**81. 11**

$CW = 2$ MSS

$1st\ RTT = 4$ MSS

$2^{nd}\ RTT = 8$ MSS(threshold = 8 MSS)

$3^{rd}\ RTT = 9$ MSS

$4^{th}\ RTT = 10$ MSS

$5^{th}\ RTT = 11$ MSS

Hence, the correct answer is 111.

**82. (D)**

Segment size $= 2000$ byte(MSS)

$CW = 6000$ byte $= 3$ MSS

On 1st ACK $CW = CW + segment\ size$

$= 6000 + 2000 = 8000$

On 2nd $ACK = 8000 + 2000 = 10,000$

ON 3rd $ACK = 10,000 + 2000 = 12000$ byte

Hence, the correct option is (D).

**83. 4**

$r_{wnd} = 6$ MSS, $c_{wnd} = 4$ MSS

Sender window $= \min(r_{wns}, e_{wnd})$

$= \min d(6, 4)$

$= 4$ MSS

We can't increase sender window size more than 4 MSS, because it can't be supported by network.

So, in next RTT it will remains same.

Hence, the correct answer is 4.

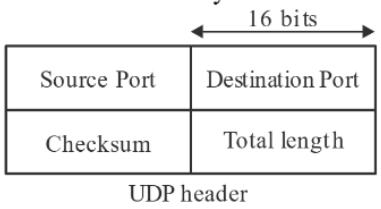
**84.** **(C)**

UDP is connection less protocol so no handshaking happen

Hence, the correct option is (C).

**85.** **52.4**

Size of UDP header = 8 byte




Total length = 16 bits

So, $\max^m$ data UDP packet $= 2^{16}$ bytes can have

$\max^m$ Time required to Send one UDP packet

$$= \frac{2^{16}\text{bytes}}{10\times10^6\text{bits/sec}}$$

$$= \frac{2^{16}\times8}{10\times10^6} = 0.0524\text{ sec} = 52.4\text{ ms}$$

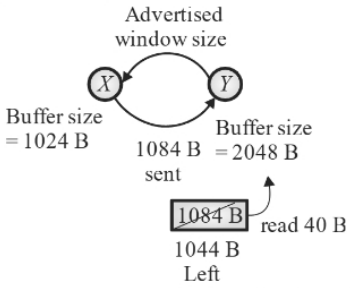
Hence, the correct answer is 52.4.

**86.** **20**


Total transmissions $= 20$

Hence, the correct answer is 20.

**87.** **1004**




$Y$'s advertised window size $= 2048 - 1044$ B

$= 1004$ B

Hence, the correct answer is 1004.

**88.** **40**

$$t_p = 25\text{ ms}$$

$$t_t = \frac{L}{R} = \frac{1000}{10^6} = 1\text{ ms}$$

$$\eta_N = \frac{N.t_t}{t_t + 2t_p} \Rightarrow \frac{80}{100} = \frac{N+1}{1+2\times25}$$

$$\Rightarrow \quad N \le \frac{80\times51}{100}$$

$$\Rightarrow \quad N \le \frac{204}{5}$$

$$\Rightarrow \quad N \le 40.8$$

$$\Rightarrow \quad N \simeq 40$$

Hence, the correct answer is 40.

**89.** **(D)**

$$R_E = \eta_N.R \Rightarrow \eta = \frac{5}{20}\times100 = 25\ \%$$

Hence, the correct option is (D).

**90.** **0.03**

$$2t_p = 30\text{ ms},\ t_t = \frac{1000}{1\times10\text{^}6} = 1\text{ ms}$$

$$\eta = \frac{t_t}{t_t + 2t_p + t_{pm} + t_{Ack}}$$

$$= \frac{1}{1+30+0.75+1.25} = \frac{1}{33}$$

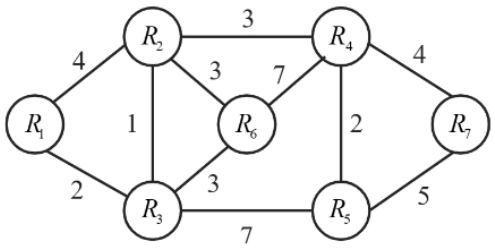
Hence, the correct answer is 0.03.

**91.** **0.94**

$$P(A\cup B) = 1 - \frac{1}{2^4} = 0.94$$

Hence, the correct answer is 0.94.

**92.** **3**



The links which remain unused are:

(1) $R_1 - R_2$

(2) $R_4 - R_6$

(3) $R_3 - R_5$

Hence, the correct answer is (3).

Hence, the correct answer is 3.

**93. (C)**

Since frame of 'B' involve in collision twice and A's frame once


$r_A r_B$

$0 \quad 0 \quad -C$

$0 \quad 1 \quad -A$

$0 \quad 2 \quad -A$

$0 \quad 3 \quad -A$

$1 \quad 0 \quad -B$

$1 \quad 1 \quad -C$

$1 \quad 2 \quad -A$

$1 \quad 3 \quad -A$

$$P(A \cup B) = \frac{6}{8} = 0.75$$

Hence, the correct option is (C).

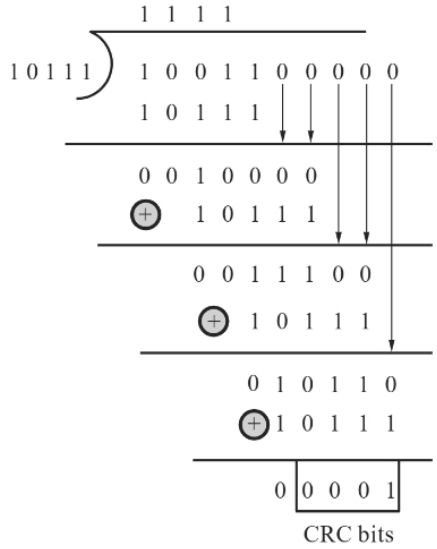
**94. 609**

divisor : $x^4 + x^2 + x + 1$

$1x^4 + 0x^3 + 1x^2 + 1x + 1$

$= 10111$

# CRC generator bits $= 4$




Code word : $\underset{2^9}{1}\,00\,\underset{2^6}{1}\,\underset{2^5}{1}\,0000\,\underset{2^0}{1}$

decimal value $= 2^9 + 2^6 + 2^5 + 2^0$

$= 512 + 64 + 32 + 1$

$= 609$

Hence, the correct answer is 609.

**95. (A,B,C,D)**

**Given:**

IP address is 210.32.64.79/25 comparing with a. b. c. d/n where n is number of bits in network id.

$0 \le a, b, c, d \le 255$

Network ID + Host ID = 32

$\therefore$ Host ID $= 32 - 26 = 6$

Subnet mask:-

11111111. 11111111. 11111111.11000000

In decimal form $= 255.255.255.192$

**First address :**

First address is obtained by making right most $32 - n$ to 0. Here n is 26, so

$32 - 26 = 6$, make right most 6 bits to 0.

210.32.64.79 =

11010010.00100000.01000000.01001111

First address

= 11010010.00100000.01000000.01000000

In decimal form = 210.32.64.64

**Last address :**

It is obtained by making right most 32-n bits to 1. Make right most 6 bits to 1. It becomes: 11010010.00100000.01000000. 01111111

In decimal form = 210.32.64.127

**Total number of address :**

Total number of addresses possible are : $2^{32-n}$

$= 2^{32-26} = 2^6 = 64$

Hence, the correct option are (A,B, C, D).

**96. 6**

Header length $= 12 \times 4 = 48$ bytes

Optional field $= 48 - 20 = 28$ bytes

Out of 28 bytes optional field 3 bytes are reserve for special purpose.

So, available bytes

In optional field $= 28 - 3 = 25$ bytes

$$\#\text{ route address} = \frac{25}{4} = 6.25$$

Where size of one 1P- address = 4 bytes.

Hence, the correct answer is 6.

**97. (C)**

In CSMA/CD

$L \geq B \times 2 \times T_P$

[This is the condition for detect the collision]

$L \geq 10 \times 10^6 \times 2 \times 1 \times 10^{-3}$

$L \geq 20 \times 10^3$

$L \geq 20000$ bit

$L \geq 2500$ byte

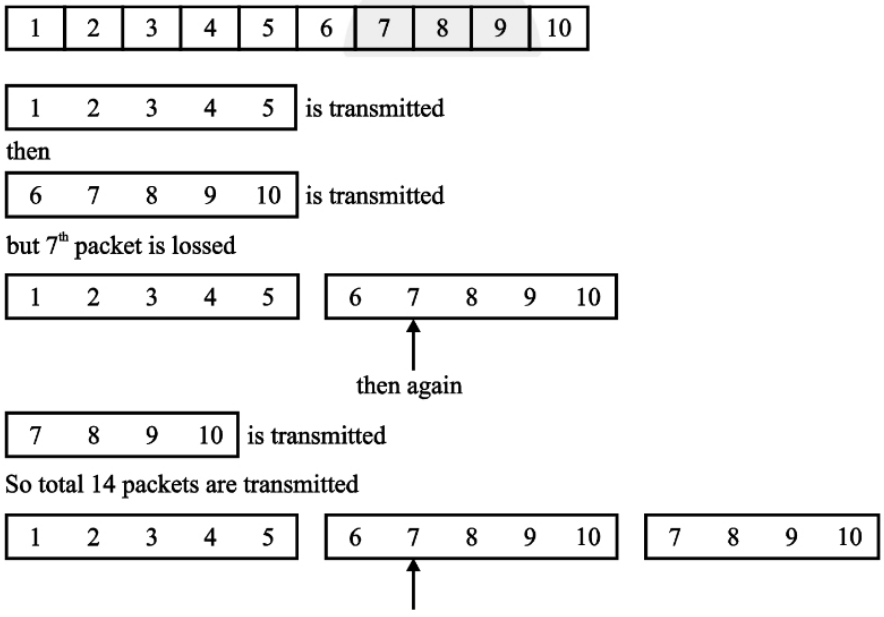
So the correct option is C

**98. $2^{21} = 2097152$**

A class C address consist of a 24 bit network address, the first 3 bits in the network address indicate the network class, leaving 21 bits for the actual network address i.e.,

$2^{21} = 2097152$ n/w

**99. 14**



**100. (C)**

Let S denotes the source station and D denotes the destination station P & Q are two intermediate nodes between S & D.

S P Q D

. . . .

Message size =48 bytes

Header (control information) = 6 bytes

Option (A)

Packet size = 8, then message size = $8-6=2$ bytes, so it requires $\frac{48}{2}=24$ packets each containing 6 bytes so the transmission time for header overhead increases.

Option (B)

Packet size = 10, then message size = 10–6 = 4 Bytes (required 12 packets)

Option (C)

Packet size = 14, then message size = 14–6 = 8 byte

(required 6 packets)

Option (D)

Packet size = 12 then message size = 12–6= 6 byte

Byte (required 8 packet)

So 6 packet is the optimum message size and 14

0.0.1.128

0.0.1.0 required 256 address

So block positions are = 256+128=384