**Course Name:** Computer Network   **AKTU Course Code:** KCS-603

1. The transport layer protocols used for real time multimedia, file transfer, 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

2. Which of the following transport layer protocols is used to support electronic mail?
   A SMTP
   B IP
   C TCP
   D UDP

3. Consider an instance of TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm where the window size at the start of the slow start phase is 2 MSS and the threshold at the start of the first transmission is 8 MSS. Assume that a timeout occurs during the fifth transmission. Find the congestion window size at the end of the tenth transmission.
   A 8 MSS
   B 14 MSS
   C 7 MSS
   D 12 MSS

4. Which of the following system calls results in the sending of SYN packets?
   A socket
   B bind
   C listen
   D connect

5. In the slow start phase of the TCP congestion control algorithm, the size of the congestion window

   A does not increase

   B increases linearly

   C increases quadratically

   D increases exponentially

6. Which one of the following uses UDP as the transport protocol?

   A HTTP

   B Telnet

   C DNS

   D SMTP

7. Let the size of congestion window of a TCP connection be 32 KB when a timeout occurs. The round trip time of the connection is 100 msec and the maximum segment size used is 2 KB. The time taken (in msec) by the TCP connection to get back to 32 KB congestion window is _____.

   A 1100 to 1300

   B 800 to 1000

   C 1400 to 1600

   D 1500 to 1700

8. Packets of the 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

9. The address resolution protocol (ARP) is used for:

   (a) Finding the IP address from the DNS

   (b) Finding the IP address of the default gateway

   (c) Finding the IP address that corresponds to a MAC address

   (d) Finding the MAC address that corresponds to an IP address

10. 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 the spanning tree 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

11. Which of the following functionalities must be implemented by a transport protocol over and above the network protocol ?
    (A) Recovery from packet losses
    (B) Detection of duplicate packets
    (C) Packet delivery in the correct order
    (D) End to end connectivity

12. On a TCP connection, current congestion window size is Congestion Window = 4 KB. The window size advertised by the receiver is Advertise Window = 6 KB. The last byte sent by the sender is LastByteSent = 10240 and the last byte acknowledged by the receiver is LastByteAcked = 8192. The current window size at the sender is
    (A) 2048 bytes
    (B) 4096 bytes
    (C) 6144 bytes
    (D) 8192 bytes

13. For a host machine that uses the token bucket algorithm for congestion control, the token bucket has a capacity of 1 megabyte and the maximum output rate is 20 megabytes per second. Tokens arrive at a rate to sustain output at a rate of 10 megabytes per second. The token bucket is currently full and the machine needs to send 12 megabytes of data. The minimum time required to transmit the data is _____ seconds.
    (A) 1.1
    (B) 0.1
    (C) 2.1
    (D) 2.0

14. Consider a TCP connection in a state where there are no outstanding ACKs. The sender sends two segments back to back. The sequence numbers of the first and second segments are 230 and 290 respectively. The first segment was lost, but the second segment was received correctly by the receiver. Let X be the amount of data carried in the first segment (in bytes), and Y be the ACK number sent by the receiver.
    The values of X and Y (in that order) are
    (A) 60 and 290
    (B) 230 and 291
    (C) 60 and 231
    (D) 60 and 230

15. Which of the following statements are TRUE?

    (S1) TCP handles both congestion and flow control
    (S2) UDP handles congestion but not flow control
    (S3) Fast retransmit deals with congestion but not flow control
    (S4) Slow start mechanism deals with both congestion and flow control

    (A) S1, S2 and S3 only
    (B) S1 and S3 only
    (C) S3 and S4 only
    (D) S1, S3 and S4 only

16. Assume that source S and destination D are connected through two intermediate routers labeled R. Determine how many times each packet has to visit the network layer and the data link layer during a transmission from S to D.
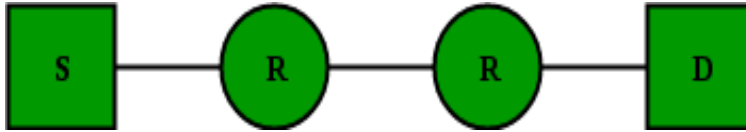
(A) Network layer – 4 times and Data link layer – 4 times
(B) Network layer – 4 times and Data link layer – 3 times
(C) Network layer – 4 times and Data link layer – 6 times
(D) Network layer – 2 times and Data link layer – 6 times

17. In an IPv4 datagram, the M bit is 0, the value of HLEN is 10, the value of total length is 400 and the fragment offset value is 300. The position of the datagram, the sequence numbers of the first and the last bytes of the payload, respectively are
(A) Last fragment, 2400 and 2789
(B) First fragment, 2400 and 2759
(C) Last fragment, 2400 and 2759
(D) Middle fragment, 300 and 689

18. Consider a source computer(S) transmitting a file of size 106 bits to a destination computer(D)over a network of two routers (R1 and R2) and three links(L1, L2, and L3). L1connects S to R1; L2 connects R1 to R2; and L3 connects R2 to D.Let each link be of length 100 km. Assume signals travel over each link at a speed of 108 meters per second.Assume that the link bandwidth on each link is 1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits. Find the total sum of transmission and propagation delays in transmitting the file from S to D?
(A) 1005 ms
(B) 1010 ms
(C) 3000 ms
(D) 3003 ms

19. One of the header fields in an IP datagram is the Time to Live(TTL)field.Which of the following statements best explains the need for this field?
(A) It can be used to prioritize packets
(B) It can be used to reduce delays
(C) It can be used to optimize throughput
(D) It can be used to prevent packet looping

20. For which one of the following reasons does Internet Protocol (IP) use the timeto- live (TTL) field in the IP datagram header
(A) Ensure packets reach destination within that time
(B) Discard packets that reach later than that time
(C) Prevent packets from looping indefinitely
(D) Limit the time for which a packet gets queued in intermediate routers.

21. Which one of the following is TRUE about interior Gateway routing protocols – Routing Information Protocol (RIP) and Open Shortest Path First (OSPF)
(A) RIP uses distance vector routing and OSPF uses link state routing
(B) OSPF uses distance vector routing and RIP uses link state routing
(C) Both RIP and OSPF use link state routing
(D) Both RIP and OSPF use distance vector routing

22. Host A (on TCP/IP v4 network A) sends an IP datagram D to host B (also on TCP/IP v4 network B). Assume that no error occurred during the transmission of D. When D reaches B, which of the following IP header field(s) may be different from that of the original datagram D?
(i) TTL
(ii) Checksum
(iii) Fragment Offset

(A) (i) only
(B) (i) and (ii) only
(C) (ii) and (iii) only
(D) (i), (ii) and (iii)

23. Classless Inter-domain Routing (CIDR) receives a packet with address 131.23.151.76. The router's routing table has the following entries:

Prefix	Output Interface Identifier
131.16.0.0/12	3
131.28.0.0/14	5
131.19.0.0/16	2
131.22.0.0/15	1

The identifier of the output interface on which this packet will be forwarded is _____.
(A) 1
(B) 2
(C) 3
(D) 5

24. An IP router with a Maximum Transmission Unit (MTU) of 1500 bytes has received an IP packet of size 4404 bytes with an IP header of length 20 bytes. The values of the relevant fields in the header of the third IP fragment generated by the router for this packet are
(A) MF bit: 0, Datagram Length: 1444; Offset: 370
(B) MF bit: 1, Datagram Length: 1424; Offset: 185
(C) MF bit: 1, Datagram Length: 1500; Offset: 37
(D) MF bit: 0, Datagram Length: 1424; Offset: 2960

25. Two computers C1 and C2 are configured as follows. C1 has IP address 203.197.2.53 and netmask 255.255.128.0. C2 has IP address 203.197.75.201 and netmask 255.255.192.0. which one of the following statements is true?
(A) C1 and C2 both assume they are on the same network
(B) C2 assumes C1 is on same network, but C1 assumes C2 is on a different network
(C) C1 assumes C2 is on same network, but C2 assumes C1 is on a different network

(D) C1 and C2 both assume they are on different networks.

26. The address resolution protocol (ARP) is used for
    (A) Finding the IP address from the DNS
    (B) Finding the IP address of the default gateway
    (C) Finding the IP address that corresponds to a MAC address
    (D) Finding the MAC address that corresponds to an IP address

27. 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:
    (A) 4
    (B) 6
    (C) 7
    (D) 9

28. If a Company require 60 hosts then What is the best possible subnet mask?
    (A) 255.255.255.0
    (B) 255.255.255.192
    (C) 255.255.225.224
    (D) 225.225.255.240

29. Routers forward a packet using forwarding table entries. The network address of incoming
    packet may match multiple entries. How routers resolve this?
    (A) Forward it the router whose entry matches with the longest prefix of incoming packet
    (B) Forward the packet to all routers whose network addresses match.
    (C) Discard the packet.
    (D) Forward it the router whose entry matches with the longest suffix of incoming packet

30. Which one of the following fields of an IP header is NOT modified by a typical IP router?
    (A) Checksum
    (B) Source address
    (C) Time to Live (TTL)
    (D) Length

31. In the network 200.10.11.144/27, the fourth octet (in decimal) of the last IP address of the
    network which can be assigned to a host is _____
    (A) 158
    (B) 255
    (C) 222
    (D) 223

32. A subnet has been assigned a subnet mask of 255.255.255.192. What is the maximum number
    of hosts that can belong to this subnet?
    (A) 14
    (B) 30
    (C) 62
    (D) 126

33. In TCP, a unique sequence number is assigned to each
    (A) byte
    (B) word
    (C) segment
    (D) message

34. In the TCP/IP protocol suite, which one of the following is NOT part of the IP header?
    (A) Fragment Offset
    (B) Source IP address
    (C) Destination IP address
    (D) Destination port number

35. Suppose that the maximum transmit window size for a TCP connection is 12000 bytes. Each packet consists of 2000 bytes. At some point of time, the connection is in slow-start phase with a current transmit window of 4000 bytes. Subsequently, the transmitter receives two acknowledgements. Assume that no packets are lost and there are no time-outs. What is the maximum possible value of the current transmit window?
    (A) 4000 bytes
    (B) 8000 bytes
    (C) 10000 bytes
    (D) 12000 bytes

36. Count to infinity is a problem associated with
    (A) Link state routing protocol.
    (B) Distance vector routing protocol
    (C) DNS while resolving host name.
    (D) TCP for congestion control.

37. Two popular routing algorithms are Distance Vector(DV) and Link State (LS) routing. Which of the following are true?
    (S1) Count to infinity is a problem only with DV and not LS routing
    (S2) In LS, the shortest path algorithm is run only at one node
    (S3) In DV, the shortest path algorithm is run only at one node
    (S4) DV requires lesser number of network messages than LS

    (A) S1, S2 and S4 only
    (B) S1, S3 and S4 only
    (C) S2 and S3 only
    (D) S1 and S4 only

38. Consider the given network implementation scenario. For the given classful NID 199.10.20.0/24, the requirement is to create 13 subnets. With given details, find the range of first and last valid IP in 15th subnet.

    (A) 199.10.20.208 to 199.10.20.222
    (B) 199.10.20.225 to 199.10.20.238
    (C) 199.10.20.193 to 199.10.20.206
    (D) Not of these

39. _____ do not take their decisions on measurements or estimates of the current traffic and topology.
    (A) Static algorithms
    (B) Adaptive algorithms
    (C) Non – adaptive algorithms
    (D) Recursive algorithms

40. The address of a class B host is to be split into subnets with a 6-bit subnet number. What is the maximum number of subnets and the maximum number of hosts in each subnet?
    (A) 62 subnets and 262142 hosts.
    (B) 64 subnets and 262142 hosts.
    (C) 62 subnets and 1022 hosts.
    (D) 64 subnets and 1024 hosts.

41. In a token ring network the transmission speed is 10^7 bps and the propagation speed is 200 meters/micro second. The 1-bit delay in this network is equivalent to:
    (A) 500 meters of cable.
    (B) 200 meters of cable.
    (C) 20 meters of cable.
    (D) 50 meters of cable.

42. Suppose the round trip propagation delay for a 10 Mbps Ethernet having 48-bit jamming signal is 46.4 ms. The minimum frame size is
    (A) 94
    (B) 416
    (C) 464
    (D) 512

43. A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, collide, and A wins the first backoff race. At the end of this successful transmission by A, both A and B attempt to transmit and collide. The probability that A wins the second backoff race is:
    (A) 0.5
    (B) 0.625
    (C) 0.75
    (D) 1.0

44. A 2 km long broadcast LAN has 107 bps bandwidth and uses CSMA/CD. The signal travels along the wire at 2 × 108 m/s. What is the minimum packet size that can be used on this network?
    (A) 50 bytes
    (B) 100 bytes
    (C) 200 bytes
    (D) None of these

45. Consider a CSMA/CD network that transmits data at a rate of 100 Mbps (108 bits per second) over a 1 km (kilometre) cable with no repeaters. If the minimum frame size required for this network is 1250 bytes, what is the signal speed (km/sec) in the cable?
    (A) 8000

(B) 10000
(C) 16000
(D) 20000

46. Which of the following statements is TRUE about CSMA/CD
    (A) IEEE 802.11 wireless LAN runs CSMA/CD protocol
    (B) Ethernet is not based on CSMA/CD protocol
    (C) CSMA/CD is not suitable for a high propagation delay network like satellite network
    (D) There is no contention in a CSMA/CD network

47. A network with CSMA/CD protocol in the MAC layer is running at 1 Gbps over a 1 km cable with no repeaters. The signal speed in the cable is 2 x 108 m/sec. The minimum frame size for this network should be
    (A) 10000 bits
    (B) 10000 bytes
    (C) 5000 bits
    (D) 5000 bytes

48. A network has a data transmission bandwidth of 20 × 106 bits per second. It uses CSMA/CD in the MAC layer. The maximum signal propagation time from one node to another node is 40 microseconds. The minimum size of a frame in the network is _____ bytes.
    (A) 200
    (B) 250
    (C) 400
    (D) 1200

49. In a packet switching network, if the message size is 48 bytes and each packet contains a header of 3 bytes. If 24 packets are required to transmit the message, the packet size is _____.
    (A) 2 bytes
    (B) 1 bytes
    (C) 4 bytes
    (D) 5 bytes

50. A certain population of ALOHA users manages to generate 70 request/sec. If the time is slotted in units of 50 msec, then channel load would be
    (A) 4.25
    (B) 3.5
    (C) 350
    (D) 450

Answer

1- c	2- c	3- c	4- d	5- d	6- c	7- a	8- b	9- d	10- b
11- d	12- b	13- a	14- d	15- b	16- c	17- c	18- a	19- d	20- c
21- a	22- d	23- a	24- a	25- c	26- d	27- d	28- b	29- a	30- b
31- a	32- c	33- a	34- d	35- b	36- b	37- d	38- b	39- c	40- c
41- c	42- c	43- b	44- d	45- d	46- c	47- a	48- a	49- d	50- b