Q.NO 1-24 CARRY 2 MARKS EACH

1. Match the following:

OSI Layer	Responsibilities
1. Network Layer	p. Encoding & Translation
2. Transport Layer	q. Feedback Messaging
3. Data Link Layer	r. Transmission Modes
4. Session Layer	s. Segmentation and Reassembly
5. Presentation Layer	t. Dialogue Control
6. Physical Layer	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

2. Let a cluster of stations share 48Kbps of pure Aloha channel. Every station outputs frames of length 1024bits on an average of every 50seconds. Then what is the maximum value of no. of stations?
   A. 413   B. 431   C. 453   D. 435

3. An IPv4 packet has the first few hexadecimal digits as shown below.
       0X4500005C000300005906….

       How many hops can this packet take before being dropped?
   A. 30   B. 59   C. 89   D. 90

4. Consider a 8Mbps token LAN with a ring latency of 256μsec. 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?
   A. 4.53   B. 5.36   C. 6.7   D. 9.4

5. In an IPv4 packet, the value of HLEN is 15, and the value of the total length field is 0X0064. How many bytes of data are being carried by this packet?
   A. 85bytes   B. 49bytes   C. 40bytes   D. 20bytes

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

7. A Sliding window protocol of 4Mbps point to point link has propagation delay of 0.5sec. Assume that each frame carries 2KB of data. What is the minimum no. of bits used for sequence number field?
   (A) 10   (B) 9   (C) 12   (D) 8

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

9. If size of a TCP segment is 1KB and header length value is 6, the sequence number = 3500. Given that URG flag = 1 and URG pointer = 45. Then what is the total size of data. How many of them are urgent, Give the sequence numbers of urgent data.

   (A) 45 bytes of urgent data, sequence no. 3500 – 3544
   (B) 45 bytes of urgent data, sequence no. 1024 – 1069
   (C) 46 bytes of urgent data, sequence no. 1024 – 1070
   (D) 46 bytes of urgent data, sequence no. 3500 – 3545

10. If the initial sequence number is 1 and it increment the counter by 2,56,000 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

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

(A) 80.5   (B) 81.3   (C) 82.5   (D) 80.0

12. Which of the following is true about TCP?
    (i)   It is a byte oriented port to port communication
    (ii) It uses a combination of SR and Go – Back N for flow control
    (iii) It connections are link to link and full duplex
    (iv) It uses piggybacking whenever possible

    (A) i, iii and iv are correct   (B) i, ii and iv are correct
    (C) ii, iii and iv are correct   (D) All are correct

13. What is the value of symmetric key in the Diffie – Hellmen protocol if A and B want to exchange the key. Given that A chooses $X_A = 3$ and B chooses $X_B = 7$, $\alpha = 7$, $p = 23$?
    (A) 17   (B) 21   (C) 13   (D) 10

14. IP packets whose total length (data plus header) is 16Kb 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

15. A building running CSMA – CD protocol is having a bandwidth of 512Mbps and distance of 2 kilometres then determine the minimum data size in order to detect a collision. Assume that the signal speed is 2,00,000km/s
    (A) 1000bytes   (B) 1250bytes   (C) 1280bytes   (D) 1024bytes

16. A system uses the Sliding window Protocol is having a bandwidth of 10Mbps with a window size of 100. What is the size of data if the distance between the sender and receiver is 72000km and the propagation speed is 3×10^8 m/sec? Given utilization is 0.5
    (A) 2048 bytes   (B) 3015 bytes
    (C) 4096 bytes   (D) 3072 bytes

17. Given the maximum lifetime of a segment is 30 sec and link capacity is 500Mbps, find the no. of bits required to avoid wrap around during this time?
    (A) 10bits   (B) 23 bits   (C) 30 bits   (D) 31 bits

18. Determine the efficiency of a token ring with a data rate of 250Mbps, a ring latency of 120 µsec and 5000 bit packets. Assume M hosts want 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) $\frac{N}{N+6}$

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

(A) 46, 240000   (B) 0, 30000   (C) 21, 19982   (D) 0, 29979

20. A 40 Mbps broadcast network that controls medium access using polling has 20 hosts and time required for polling the next host is 80 µsec. whenever a node is polled, it is allowed to transmit 4000bytes. Find the efficiency of the broadcast channel

(A) 100/9   (B) 100/11   (C) 80/7   (D) 10/11

21. An Internet Service Provider (ISP) is granted a block of addresses starting with 145.75.0.0/16. The ISP needs to distribute these addresses to three groups of customers as follows:

(a) The first group has 128 customers; each needs 256 addresses.

(b) The second group has 128 customers; each needs 64 addresses.

(c) The third group has 64 customers; each needs 128 addresses.

Find the first address of 128th customer of 2nd group and how many addresses are still available with ISP after these allocations.

(A) 145.75.127.128/24, 32768   (B) 145.75.159.192/26, 16384

(C) 145.75.159.192/26, 32768   (D) 145.75.191.128/25, 16384

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

(A) 5MBPS   (B) 10Mbps   (C) 1MBPS   (D) 1Mbps

Common Data Questions: Q. 23 and Q. 24 Carry Two Marks Each
Statement for Common Data Questions

An organization is granted the block 150.36.0.0/16.The administrator wants to create 512 subnets.

23. What is the subnet mask?

    (A) 255.255.255.128/25   (B) 255.255.255.192/26

    (C) 255.255.255.224/27   (D) 255.255.255.240/28

24. Find number of hosts in each subnet. Find the first and last host in the first subnet.

    (A) 128, 150.36.0.1 and 150.36.0.127   (B) 128, 150.36.0.129 and 150.36.0.255

    (C) 126, 150.36.0.1 and 150.36.0.126   (D) 126, 150.36.0.129 and 150.36.0.254.

COMPUTER NETWORK

1. At which layer, the trailer usually contains bits used for error detection?

(a) Network

(b) Session

(c) Transport

(d) Data Link

2. How many IP addresses does the network 192.68.72.0/20 contain?

(a) 2^{20}

(b) 2^{20}-2

(c) 2^{12}

(d) 2^{12}-2

3. Consider the following message M=1010001011. The cyclic redundancy check(CRC) for this message using the divisor polynomial $x^5 + x^3 + x^2 + 1$ is:

(a) 01110

(b) 01011

(c) 10110

(d) 01101

4. What could be the network mask if direct broadcast address of a network is 168.17.07.255?

(a) 255.255.248.0

(b) 255.255.252.0

(c) 255.255.254.0

(d) 255.255.255.0

(e) All the above

5. A broadcast channel has 10 nodes and total capacity of 16Mbps. It uses polling for medium access. Once a node finishes transmission, there is a polling delay of 100 µseconds to poll the next node. Whenever a node is polled, it is allowed to transmit a maximum of 1500 Bytes. The maximum throughput of broadcast channel is:

(a) 8 Mbps

(b) 14 Mbps

(c) 100/11Mbps

(d) 750/85 Mbps

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

(a) HTTP
(b) Telnet
(c) SMTP
(d) DNS

7. In Ethernet, when Manchester Encoding is used, the bit rate is

(a) Half the Baud Rate
(b) Twice the Baud Rate
(c) Same as Baud Rate
(d) None of the above

8. Station A needs to send a message consisting of 15 packets to station 'B' using a sling window (window size 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) 33
(c) 27
(d) 25

9. A is sending data to host B over a full duplex link. A and B are using the sliding window protocol for few control. The send and receive window size are four(4) packets each. Data packets (sent only from A to B) are all 1500 Bytes long and the transmission time for such a packet is 60 µseconds. Acknowledgement packets are very small(sent from B to A) and require very negligible time. The propagation delay over the link is 170 µseconds. What is the maximum achievable throughput in the communication?

(a) 3.75×10^6 Bps
(b) 7.5×10^6 Bps
(c) 15×10^6 Bps
(d) 12.75×10^6 Bps

10. Suppose a CSMA/CD network is operating at 1 Gbps, and suppose there are no repeaters and the length of cable is 1Km. Determine the minimum frame size is the signal propagation speed is 200 Km/ms.

11. Station 'A' uses 64 Byte packets to transmit messages to station 'B' using a sling window protocol. The round trip delay between A and B is 80 milliseconds and the bottleneck bandwidth

on the path between 'A' and 'B' is 128 Kbps. What is the sender window size for maximum efficiency?

12. In a sliding window ARQ scheme, the transmitter's window size is 'N' and the receiver's window size is 'M'. The minimum number of sequence numbers (distinct) required to ensure correct operation of the ARQ scheme is:

(a) Min(M, N)
(b) max(M,N)
(c) M+N
(d) M*N

13. A 25 Kbps satellite link has a propagation delay of 400 ms. 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) 5Kbps
(b) 7.7Kbps
(c) 15 Kbps
(d) 10 Kbps

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

(a) 480 Bytes
(b) 480 bits
(c) 160 Bytes
(d) 160 bits

15. Which of the following is an application layer service?

(a) Remote login
(b) File transfer and access
(c) Mail Service
(d) All of above

16. In TDM medium access control bus LAN, each station is assigned one time slot per cycle for transmission. Assume that the length of each time slot is time to transmit 100 bits plus end-to-end propagation delay. Let propagation speed is $2 * 10^8$ m/sec. Length of LAN is 1Km with a bandwidth of 10 Mbps. Maximum number of stations that can be allowed in a LAN, so that the throughput of each station can be 2/3 Mbps is

(a) 3   (b) 5
(c) 10   (d) 20

17. Assertion[A] and Reason[R]

(A) Data link protocols always put CRC in a trailer rather than in a header.

(R) CRC is computed during transmission and appended to the output stream as soon as the last bit goes out.

(a) Both (A) and (R) are true and (R) is the correct reason for (A)

(b) Both (A) and (R) are true but (R) is not the correct reason for (A)

(c) Both are false

(d) (A) is true but (R) is false

18. In Go-Back-N protocol, if the maximum window size is 127, what is the range of the sequence number?

(a) 0 to 127   (b) 0 to 128
(c) 1 to 127   (d) 1 to 128

COMPUTER NETWORK

1. Suppose 'A' and 'B' are on same 10Mbps Ethernet segment and the propagation delay between two nodes is 275 bit times. Suppose A and B are on two ends of the wire and tries to send a frame at time t=0 and frames collide. Then at what time (in bits) they finish transmitting a jam signal. Assume 48 bit jam signal.
   A. 598   B. 323   C. 502   D. 227

2. Suppose each station in IEEE 802.5 with 1bit delay is 48m apart from its neighbouring stations. Token is of 3 Bytes and propagation delay is 2.4 * 108 m/sec. To avoid overlapping in the 4Mbps token ring in the monitor must insert 15 bits of artificial delay into ring. How many stations are there in the ring?
   A. 2   B. 3   C. 4   D. 5

Common Data Questions: Q.3 and Q.4

3. A group of N stations share 100 Kbps slotted ALOHA channel. Each station output, a 500 bits frame on an average of 5000 ms; even if previous one has not been sent. What is the required value of N?

4. What if Pure ALOHA channel is used in previous question instead of slotted ALOHA?

5. 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

Data Linked Type Question: Q.6 and Q.7

6. 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 sequence numbers. Assume propagation speed of 8 microsec/ km?
   A. 63   B. 110   C. 123   D. 145

7. What is the number of sequence bits used in above question (Number of bits used for sequence number) ?

8. A system with redundant bridges might have a problem with_____ in the system.
   A. Loops   B. Flooding   C. Filters   D. All of the above

9. Let bandwidth of a token ring is 4 Mbps and THT be 15ms. What is the maximum frame size and maximum payload size?

10. Length of a 16 Mbps token ring network is 1000 meters. Speed of propagation in cable is 60% of the speed of light. Each station holds token for 5 μsec. How long does it take for a 3 Byte token to go around the ring? (The number of stations in ring = 20)
    A. 1.36 μsec   B. 5.56 μsec   C. $1.36*10^{-4}$ sec   D. $1.06*10^{-4}$ sec

11. If bandwidth of a ring is 4 Mbps, length of the token is 24 bits, speed of light is 60% of the speed of light. Find the minimum length of the cable in the token ring with no other delay?
    A. 980 mtr   B. 1800 mtr   C. 1080 mtr   D. 1100 mtr

12. If we have only 600 mtr wire, then how much delay should be introduced in bit time in previous question so that token ring operates correctly.
    A. 9 bits   B. 11 bits   C. 26 bits   D. 12 bits

13. Consider a 10 Mbps token LAN with a ring latency of 400 μsec. A host need to transmit, seizes the token, then it sends a frame of 1000 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, the effective data rate?

14. What is the primary purpose of ARP?
    A. Translate URLs to IP Address.
    B. Resolve IPV4 addresses to MAC addresses.
    C. Provide dynamic IP configuration to network devices.
    D. Convert interval private addresses to external public addresses.

15. In a network of LANs connected by bridges, packets are sent from one LAN to another through intermediate 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

16. 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

17. An organization has a class-B network and wishes to form subnets for 24 departments. The subnet mask would be:

    A. 255.255.224.0   B. 255.255.240.0   C. 255.255.248.0   D. 255.255.252.0

18. 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 destinations 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

19. In IP4 addressing format, the number of networks allowed under Class-C address is:

   A. 2^{24} B. 2^{21} C. 2^{8} D. 2^{8}-2

20. Suppose a subnet 'X' has a subnet mask 255.255.192.0 and a system A has IP 157.106.46.234. Which of the following belongs to same network A?

    A. 157.106.65.03

    B. 157.106.142.77

    C. Both (A) and (B)

    D. None of these

COMPUTER NETWORK

1. A company has a Class-C address of 204.204.204.0. It wishes to have three subnets, one with 100 hosts and two with 50 hosts each. Which one of the following options represent a feasible set of subnet mask/ subnet address pair?
   A. 255.255.255.192/ 204.204.204.128
      255.255.255.128/ 204.204.204.0
      255.255.255.128/ 204.204.204.64
   B. 255.255.255.192/ 204.204.204.0
      255.255.255.128/ 204.204.204.192
      255.255.255.128/ 204.204.204.64
   C. 255.255.255.128/ 204.204.204.128
      255.255.255.192/ 204.204.204.192
      255.255.255.192/ 204.204.204.224
   D. 255.255.255.128/ 204.204.204.128
      255.255.255.192/ 204.204.204.64
      255.255.255.192/ 204.204.204.0

2. Two computers A and B are configured as follows. A has IP address 203.197.17.157 and netmask 255.255.128.0. B has IP address 203.192.192.201 and netmask 255.255.192.0. Which one of the following statements is true?
   A. A and B both assume they are on same network.
   B. B assumes A is on same network but A assumes B is on a different network.
   C. A assumes B is on same network, B assumes A is on a different network.
   D. A and B both assume they are on different networks.

3. A router uses the following routing table:

Destination	Mask	Interface
144.72.0.0	255.255.0.0	Eth0
144.72.64.0	255.255.224.0	Eth1
144.72.68.0	255.255.255.0	Eth2
144.72.68.64	255.255.255.224	Eth3

A packet bearing a destination address 144.72.68.117 arrives at router on which interface will it be forwarded?
A. Eth0   B. Eth1   C. Eth2   D. Eth3

4. 127.0.127.195 is a:
   A. Limited Broadcast Address
   B. Direct Broadcast Address
   C. Multicast Address
   D. Loop Back Address

5. 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

6. Resource Reservation is a feature of:
   A. Circuit Switching
   B. Packet Switching
   C. Both (A) and (B)
   D. None of these

7. Consider the following network:
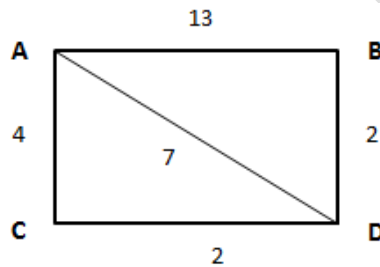
Using Distance Vector Routing, the distance to 'B' that 'A' will store initially in its routing table_____ and once the router have been converged, the distance to B that A will store in its routing table is_____?
   A. 9 and 8
   B. 13 and 9
   C. 13 and 8
   D. 13 and 13

8. In OSPF, which of the following router should be in area zero?
   A. Area Border Router
   B. Designated Router
   C. Backbone Router
   D. Boundary Router

Common Data Questions: Q. 9, Q. 10 and Q.11

Consider three IP networks A, B and C. Host H_A in networks 'A' sends message each containing 180 B of application data to a host H_C in network H_C. The TCP layer prefixes 20 Bytes header to

the message. This passes through on intermediate network 'B'. The maximum packet size, including 20B IP headers in each network is:

A. 500 Bytes

B. 100 Bytes

C.1000 Bytes

The network A and B are connected through 512 Kbps link, while B and C are connected by a 256 Kbps link.

9. Assuming that the packets are correctly delivered, how many Bytes including headers, are delivered to IP layer at destination for one application message in the best case? Consider only data packets.

    A. 220   B.240   C. 260   D. 280

10. What is the rate at which application data is transferred to host H? Ignore errors, acknowledgements and other overheads?

    A. 196 Kbps   B. 177.23 Kbps   C. 354.5 Kbps   D. 325.5 Kbps

11. What is the extra overhead caused by fragmentation?

    A. 40 Bytes   B. 20 Bytes   C. 0 Bytes   D. 60 Bytes

12. For the network given in the figure below, the routing table of the nodes A, E, D and G are shown. Suppose that F has estimated its delay to its neighbours A, E, D and G are 8, 10, 12 and 6 msecs respectively and update its routing table distance vector routing technique.
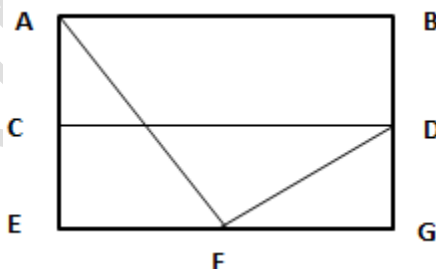
Routing Tables:

A

A	0
B	40
C	14
D	17
E	21
F	9
G	24

E

A	24
B	27
C	7
D	20
E	0
F	11
G	22

D

A	20
B	8
C	30
D	0
E	14
F	7
G	22

G

A	21
B	24
C	22
D	19
E	22
F	10
G	0

Which one of the following options represents the updated routing table of F?

(A)			(B)			(C)			(D)		
	A	8		A	21		A	8		A	8
	B	20		B	8		B	20		B	8
	C	17		C	7		C	17		C	7
	D	12		D	19		D	12		D	12
	E	10		E	14		E	10		E	10
	F	0		F	0		F	16		F	0
	G	6		G	22		G	6		G	6

Linked Answer Type Question

Consider the network with 6 Routers R1 to R6 with links and weights as shown below:
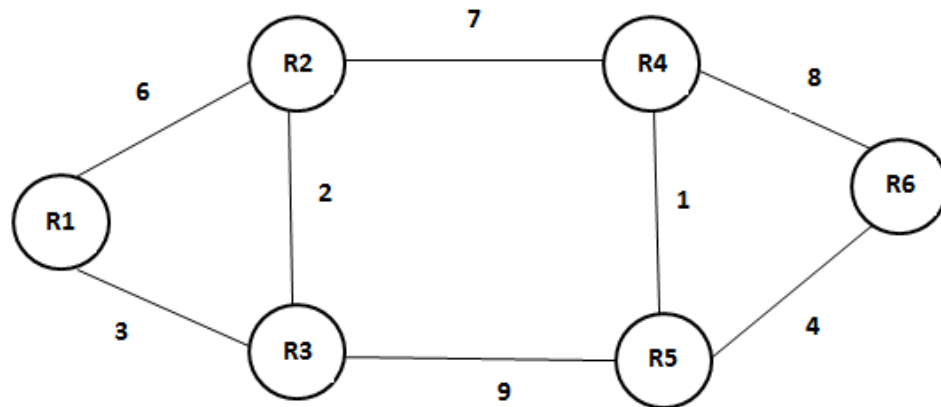
Common Data Questions: Q.13 and Q.14

13. After routing tables stabilize using distance vector routing. How many links in the network will never be used for carrying any data?

   A. 4   B. 3   C. 2   D. 1

14. Suppose, weight of all unused links in the previous question are changed to 2 and using DVR, all routing tables stabilizes. How many links will now remain unused?

   A. 0   B. 1   C. 2   D. 3

15. 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 is run only at one node.
   (c) In DV, the shortest path algorithm, run only at one node.
   (d) DV requires lesser number of messages than LS.

A. a, b and d

B. a, c and d

C. b and c only

D. a and d only

16. 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

17. 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 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

18. What is the maximum size of data that the application layer can pass on to the TCP layer below?
    A. Any size
    B. 216 B to Header size
    C. 216 Bytes
    D. 1500 Bytes

19. 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

20. What mechanism is used by TCP to provide flow control as segments travel from source to destination?
    A. Sequence number
    B. Session establishment
    C. Window size
    D. Acknowledgement

COMPUTER NETWORK

1. How many networks of class B are possible
   (a) 2^{32} (b) 2^{16}
   (c) 2^{14} (d) 2^{7}

2. In which of the following strategies, bits from HID are chosen in an IP address. (HID means Host ID).
   (a) subnetting   (b) supernetting
   (c) NAT   (d) None of these

3. In a subnet mask, number of 0's indicated
   (a) NID   (b) HID
   (c) both   (d) None of these

4. In the network layer stack, which layer is responsible for link to link communication:
   (a) physical layer   (b) data link layer
   (c) network layer   (d) transport layer

5. 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

6. Which of the following layer is responsible for routing
   (a) physical layer   (b) data link layer
   (c) network layer   (d) transport layer

7. In TCP, the sequence number given to a segment is sequence number of _____ byte
   (a) first byte   (b) last byte
   (c) middle byte   (d) None of these

8. Trace route program is implemented using which concept(s)
   (a) feedback messaging (ICMP)
   (b) time to live
   (c) both
   (d) None of these

9. SMTP uses which protocol at the transport layer
   (a) TCP   (b) UDP
   (c) IP   (d) None of these

10. In the checksum calculation at TCP, which of the following are used
    (a) TCP header   (b) TCP data
    (c) Pseudo header from IP   (d) All the above

11. In IP, checksum is calculated at
    (a) source   (b) routers
    (c) source and routers   (d) none of these

12. CRC is calculated at what layer
    (a) physical layer   (b) data link layer
    (c) network layer   (d) transport layer

13. In Ethernet, what is the access control strategy used
    (a) CSMA/ CD   (b) CSMA/ CA
    (c) token passing   (d) None of these

14. 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) $2^K + 1$

 15. Which routing algorithm suffers from count to infinity?
     (a) DVR   (b) LSR
     (c) both   (d) None of these

16. In public key, private key cryptography, if 'A' has Pu_A and Pr_A, 'B' has Pu_B and Pr_B as
    public and private keys. Then if 'A' wants to send a message to 'B' securely 'A' will use
    which key for encryption
    (a) Pu_B (b) Pu_B
    (c) Pr_A (d) Pr_B

17. What are the main responsibilities of transport layer?
    (a) Error control   (b) Flow control
    (c) Segmentation   (d) All the above

18. If Bandwidth of an Ethernet can is 100Mbps, distance of the LAN is 1Km, 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) 1000 bytes

19. In a token ring, if the propagation delay in a ring is equal to the transmission delay, then what
    is the maximum efficiency? Assuming that only one station is in token ring.
    (a) 100%   (b) 50%
    (c) 25%   (d) 12.5%

 20. In the following graph, if DRV is applied, how many edges go unused?
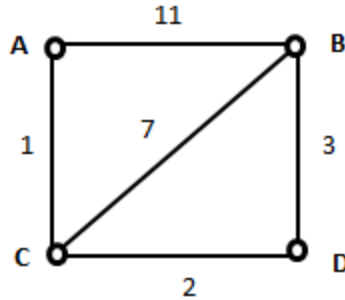
(a) 1   (b) 2

(c) 3   (d) 4

21. If a class B network is divided 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
(b) 16, 16   (d) 4, $2^{14}-2$

22. If the IP is 193.1.2.3, Sm= 255.255.255.240. Then number of subnets and hosts possible in each subnet are:
(a) 16, 14   (b) 16, 16
(c) 14, 14   (d) 14, 16

23. Wrap around time in TCP depends on
(a) sequence number bits   (b) bandwidth
(c) both (a) and (b)   (d) None of these

24. When a datagram is fragmental, which of the following fields may change?
(a) Fragment offset   (b) more fragment (MF) flag
(c) Total length   (d) All the above

25. In a public key, private key cryptography, scheme given below, identify 'A' and 'B'.
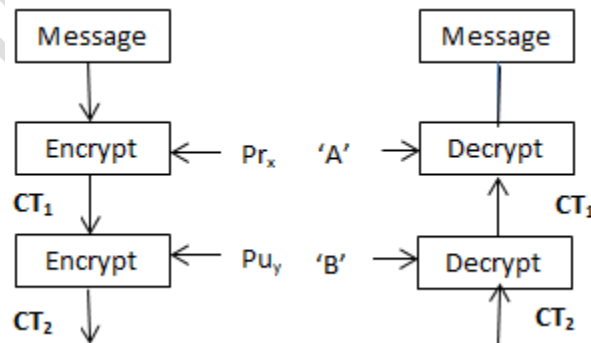
(a) A= Pu_y, B= Pr_x (b) A= Pr_x, B= Pu_y
(c) A= Pr_y, B= Pu_x (d) A= Pu_x, B= Pr_y

26. In a IP datagram, a TCP segment is present. Total length of IP datagram is 1000 bytes. Header length field in TCP header is 7. Then what is size of TCP data present in the

3

datagram.

(a) 988   (b) 952

(c) 964   (d) 900

27. If the receiver capacity is 16 mss. If the slow start phase starts with 1 mss and no congestion is detected until maximum receiver capacity is reached. After how many RTT's maximum receiver capacity is reached?

(a) 9   (b) 10

(c) 11   (d) 12

Common Data Questions: 28 and 29

For the above graph, if the numbers associated with each edge are weights the links, then if DVR is used
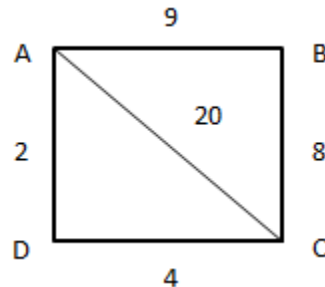
28. What is the routing table at 'c' after the tables are stabilized

(a)
A	20	A
B	8	B
C	0	C
D	4	D

(b)
A	6	D
B	8	B
C	0	C
D	4	D

(c)
A	20	A
B	8	D
C	0	C
D	4	D

(d)
A	20	A
B	8	B
C	0	C
D	4	D

29. Which edge(s) are never used in the above graph

(a) AB   (b) BC

(c) AC   (d) All the above

Common Data Questions: 30 and 31

An ISP has a block with block ID as shown: 193.1.0/ 24

30. The number of bits reserved for Host ID and the number of hosts possible are

(a) 2^4, $2^{24}-2$ (b) 8, 2^8-2

4

(c) 3^2, 2^{32}-2   (d) 16, 2^{16}-2

31. If the ISP wants to divide the block between three organizations having the requirement 120, 60 and 60, then purpose the block ID's for the division
    (a) 193.1.2.0/25, 193.1.2.128/26, 193.1.2.192/26
    (b) 193.1.2.0/120, 193.1-.-128/60, 193.1.2.192/60
    (c) 193.1.2.128/25, 193-1.2-.64/26, 193.1.2.0/26
    (d) Both (a) and (c)

Common Data Questions: 32 and 33

32. If the distance between two nodes is 2 Km, velocity of signal in the medium is $2*10^8$m/s, each frame is 1000 bits and bandwidth of the link is 1Gbps. If the channel is error free (no need of SR or GBN), and pure sliding window protocol is used, then what is sender window size:
    (a) 61   (b) 41
    (c) 21   (d) 11

33. From the above question, how many bits are required in the sequence number field?
    (a) 6   (b) 5
    (c) 4   (d) 3