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.