COMPUTER NETWORK

Explanations

1. How many networks of class B are possible

(a) 2^{32} (b) 2^{16}

(c) 2^{14} (d) 2^{7}

Solution: Option (b)

In class B, 16 bits are chosen for network ID and from these 16 bits, 2 bits are reserved for "10", and so 14 bits are remaining.

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

Solution: Option(a)

In subnetting, bits from HID are chosen and used as subnet ID.

3. In a subnet mask, number of 0's indicated

(a) NID (b) HID

(c) both (d) None of these

Solution: Option (b)

In subnet mask, no. of 0's indicate HID and no. of 1's indicate (NID + SID) part.

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

Solution: Option (b)

DLL is responsible for link to link and transport layer is responsible for end to end communication.

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

Solution: Option (c)

192.168.1.1 is a private address in class C.

6. Which of the following layer is responsible for routing

(a) physical layer (b) data link layer

(c) network layer (d) transport layer

Solution: Option (c)

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

   Solution: Option (a)

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

   Solution: Option (c)

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

   Solution: Option (a)

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

    Solution: Option (d)
    In TCP check sum calculation, it is calculated on TCP header, TCP, data and pseudo header from IP are used.

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

    Solution: Option (c)
    Source and routers, as the heard of IP changes at every router, are have to calculate it at every Router.

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

    Solution: Option (b)

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

    Solution: Option (a)

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) $2^K + 1$

    Solution: Option (a)

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

    Solution: Option (a)

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

    Solution: Option (c)
    If the message is encrypted using Pu_B, then it can be decrypted using only Pr_B, which will be known only to 'B'.

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

    Solution: Option (d)

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

    Solution: Option (b)

    $\text{Trans} = 2 * T_{prop}$

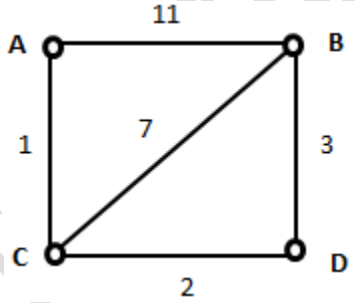
→ $\frac{L}{B} = 2 * \frac{d}{v}$

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

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%

    Solution: Option (b)
    For maximum efficiency, early token reinsertion is used.
    Therefore, Efficiency=$\frac{1}{1+\frac{a}{N}}$, where a=$\frac{T_{prop}}{T_{trans}}$
    Since, $T_{prop}=T_{trans}$,
    a=1 and N=1 (given)
    Therefore, Efficiency= $\frac{1}{1+\frac{1}{1}}=\frac{1}{2}$=50%

20. In the following graph, if DRV is applied, how many edges go unused?



    (a) 1 (b) 2
    (c) 3 (d) 4

    Solution: Option (a)

    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→ C → D → B

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

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

Solution: Option (a)

Number of 1's= NID + SID

In class B, NID = 16

255.255.192.0= 11111111.11111111.110
00000.00000000

∴ 1's = 18

18 = NID + SID

→ 16+ SID =18 → SID= 2

∴ Number of subnets= 2^2= 4

Number of 0's in Sm indicates HID part.

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

∴ Hosts per subnet= 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

Solution: Option (a)

193.1.2.3 is a class C address.

∴ NID= 24 bits

255.255- 255.240 = 11111111.11111111.11111111.1111000

∴ Number of 1's= 28 and number of 0's =4

Number of 1's= NID + SID

→ 28= 24 + SID → SID= 4

∴ Number of subnets= $2^{SID} = 2^4 = 16$

Number of hosts per subnet= $2^{\text{Number of 0's}}$ -2

$= 2^4 – 2 = 14$

23. Wrap around time in TCP depends on

(a) sequence number bits (b) bandwidth

(c) both (a) and (b) (d) None of these

Solution: Option (c)

If 'n' is the sequence number bits and B is the bandwidth in bytes/sec.

Then, wrap around time = $\frac{2^n}{B}$

∴ WAT depends on sequence number bits as well as BW.

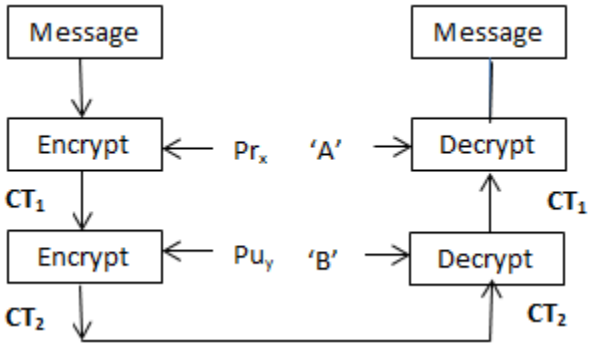
24. When a datagram is fragmental, which of the following fields may change?

(a) Fragment offset (b) more fragment (MF) flag

(c) Total length (d) All the above

Solution: Option (d)
When a datagram is fragmented, its length will change, fragment offset and MF will change.

25. In a public key, private key cryptography, scheme given below, identify 'A' and 'B'.

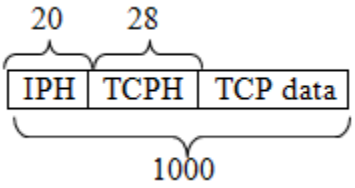


(a) A= Pu_y, B= Pr_x (b) A= Pr_x, B= Pu_y
(c) A= Pr_y, B= Pu_x (d) A= Pu_x, B= Pr_y

Solution: Option (c)
In public key- private key, if Pu is used for encryption, then corresponding Pr should be used for decrypting.

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 datagram.
(a) 988 (b) 952
(c) 964 (d) 900

Solution: Option (b)
Given IP header field= 5

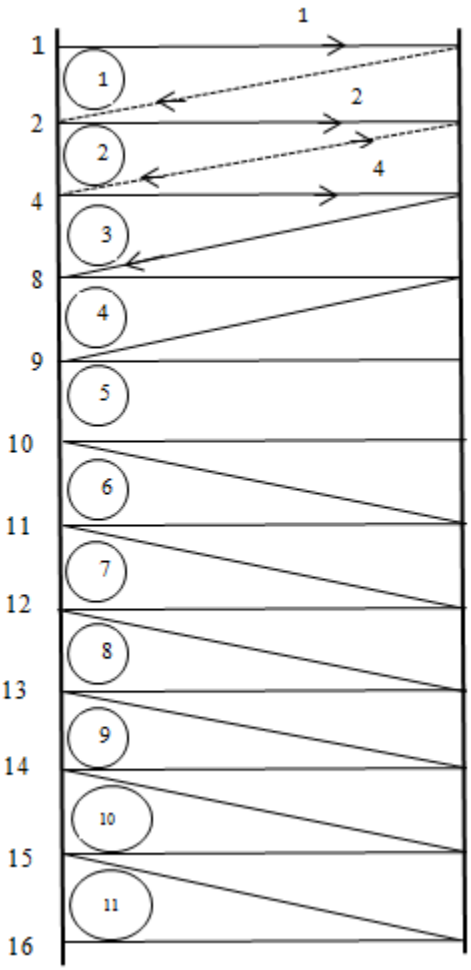


∴ IP header size= 5*4= 20 bytes
Similarly, TCP header field= 7
Therefore, TCP header size= 7*4= 28
TCP data= 1000 – 20 – 28 = 952

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

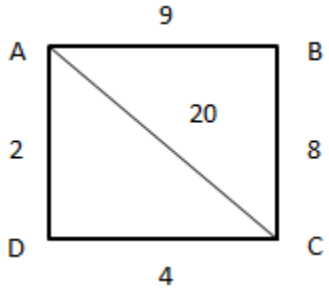
(c) 11 (d) 12

Solution: Option (c)



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

Solution: Option (b)
Applying DVR algorithm, final answer is ‘b’.

29. Which edge(s) are never used in the above graph
(a) AB (b) BC
(c) AC (d) All the above

Solution: Option (c)

In the graph AC is not the shortest path between A and C or C and A. So, it is never used.

Common Data Questions: 30 and 31

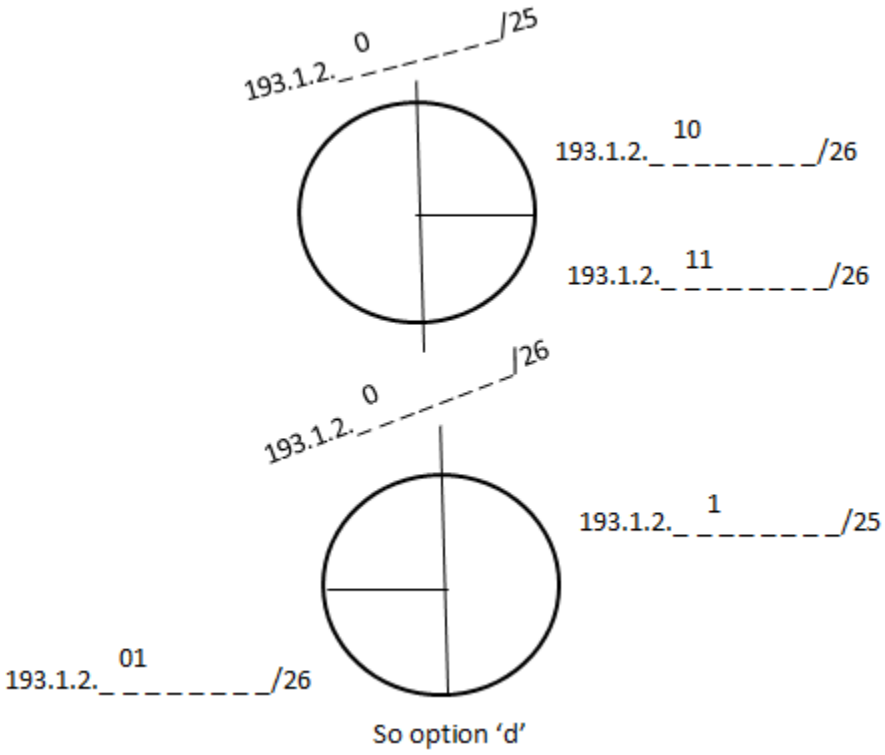
An ISP has a block with block ID as shown: 193.1.0/24

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

Solution: Option (b)
If CIDR representation is a.b.c.d/n, then host= 32 – n and hosts s= 2^{32}- n- 2
Therefore, here n= 24
So, host ID = 32 – 24 =8
Hosts= 2^{32}-2^4= 2^8 -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)

Solution: Option(d)



So option 'd'

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

Solution: Option (c)
Distance= 2 Km= $2*10^3$ m
Velocity= $2 * 10^8$ m/s

Therefore, $T_{prop}=\frac{d}{v}=\frac{2*10^3}{1*10^8}=10^{-5}sec=\frac{10}{10}*10^{-5}sec=10\mu sec$

Length of frame is 1000 bits
Between is 1Bbps

Therefore, $T_{trans}=\frac{L}{B}=\frac{1000}{10^9}=10^{-6}=1\mu sec$

window size$=\frac{T_{trans}+2*T_{prop}}{T_{trans}}=\frac{1\mu s+2\mu s*10\mu s}{1\mu s}=21$

33. From the above question, how many bits are required in the sequence number field?

(a) 6 (b) 5
(c) 4 (d) 3

Solution: Option (b)

Number of bits in F_{eg} number field is $\lceil \log_2 \text{window size} \rceil = \lceil \log_2 21 \rceil = 5$