OVERALL ANALYSIS | Solution Report

All | Correct Answers | Wrong Answers | Not Attempted Questions

Q.1) Max Marks: 1

While sending the data of M bytes from the physical layer to the transport layer. On every layer physical to transport H bytes of header is uploaded. What is the overhead percentage due to a header on the link? The size of M is 8 times of Header? [Write your answer correct up to two places of decimal]

Correct Answer

Solution: (33.33)

Physical to transport = 4 layer

Every layer = H bit overhead

Total overhead= 4H

M= 8H

Overhead %= Overhead/ total

= 4H/ 4H + M

= 4H/4H + 8H

= 4H/12H= 33.33 %

Q.2) Max Marks: 1

For non-repudiation protocol of network security, which of the following statements is /are true?

1) the receiver can verify the claimed identity of the sender

2) sender cannot later repudiate the contents of the message

3)the receiver cannot possibly have concocted the message himself

A **all the above** Correct Option

Solution: (A)

Nonrepudiation is the assurance that someone cannot deny something. Typically, nonrepudiation refers to the ability to ensure that a party to a contract or a communication cannot deny the authenticity of their signature on a document or the sending of a message that they originated.

a. Yes, the receiver can verify the claimed identity of the sender.
b. A sender can not later repudiate or deny the message.
c. A receiver can not also modify the content.

B **1 and 3 only**

C **2 and 3 only**

D **2 only**

Q.3) Max Marks: 1

Which of the following option is true?

A **If different keys used for encryption and decryption it is symmetric-key cryptography.**

B **The public key is available to everyone and we can transfer it on the channel.** Correct Option

Solution: (B)

In a symmetric key cryptography same key is use for encryption and decryption.
The public key is available to everyone . We can share the public key on the channel.
Authentication is not about only sending cypher text. Authentication means something which is sent by the correct sender. If the sender wants to authenticate with the receiver. We use digital signatures for authentication.

C **Authentication is sending a ciphertext to the receiver.**

D **None of the above.**

Q.4) Max Marks: 1

The Ip address of the interface of the router is 172.16.34.12/27. What is the broadcast address the hosts will use on the LAN?

A 172.16.34.63

B 172.16.34.31 — Correct Option

Solution: (B)
mask = 27 host bits= 5
For subnet id put all host bits= 0
172.16.34.0
For broadcast address all host bits= 1
172.16.34.00011111 = > 172.16.34.31
DBA= 172.16.34.31

C 172.16.34.127

D 172.16.34.15

Q.5) Max Marks: 1

A link is having a bandwidth of 30kbps. We are using the sliding window protocol GO back N ARQ which is having a 100 % efficiency and the propagation delay is 200 ms. The size of the frame is 60 bytes. What is the min sequence bits required for maintaining the window size N?

Correct Answer

Solution: (5)

Transmission time = Data size/ Bandwidth= (50 x 8) / (30 x 10^3)=16 ms

Propagation delay = 200 ms

a= Tp/Tt= 200/16= 12.5 ms

Efficiency = WS/ (1 + 2a)

1 = N/ (1+ 2 x 12.5)

N= 25

IN GBN WS<= 2^m -1, m= 5

Q.6) Max Marks: 1

Which of the following addresses is used to deliver a message to the correct application program running on a host?

A Port — Correct Option

Solution: (A)
Port number is a way to identify a specific process to which an Internet or other network message is to be forwarded when it arrives at a server.
Each application can run only on a socket which is unique i.e. not used by other applications.
Socket = IP Address+ Port number
So ports numbers provide you with so many sockets for an application to use.

B IP

C Logical

D Physical

Q.7) Max Marks: 1

Consider an IP address 10.16.4.75/22. Pick the correct statement about the IP address.
?

1. The subnet address is 10.16.4.0
2. The subnet mask is 255.255.248
3. The last host address of the subnet is 10.16.7.255
4. The DBA of the subnet is 10.16.7.254

A Only 1 is true — Correct Option

Solution: (A)
Subnet mask number: 22
The IP address is 10.16.4.75
For subnet id put host bits as zero.
So 10.16.4.0 is the subnet id.
For mask no = 22 Which means= 11111111.11111111.11111100.00000000
=255.255.252.0

Last host address= 10.16.00000111.11111110= 10.16.7.254
DBA= 10.16.7.255

B Only 3 is true

C All are true.

D Only 1, 2 and 3 are true.

Q.8) Max Marks: 1

If an Ethernet port on a router were assigned an IP address of 172.16.112.1/25, what would be the third host of the subnet ?

A 172.16.112.4

B 172.16.112.3 Correct Option

Solution: (B)
mask no = 25, host bits= 7
For subnet bits put all host bits zero, So subnet id= 172.16.112.0
For third host last bits= 001
Third host 172.16.112.00000011 = 172.16.112.3

C 172.16.0.4

D 172.16.0.3

Q.9) Max Marks: 1

St 1: LSP packets are used in distance vector for getting the distance vector of the adjacent nodes.
St 2: Splint horizon is used to prevent loops in the distance vector routing.
St 3: EBGP are used to communicate between two autonomous systems.

A St 1 and st 2 is correct

B All are correct

C St 2 is correct

D St 2 and St is correct. Correct Option

Solution: (D)

=> LSP packets are used in link-state routing for getting an overview of the network. It is not used in distance vector routing.

=>Split horizon is the technique used in distance vector routing to counter the count to infinity problem.

=> External border gateway protocol is used in path-vector routing for communicating between two external routers.

Q.10) Max Marks: 1

In an Ethernet network, which of the following are true:

A Ethernet switches learn addresses by looking at the destination address of packets as they pass by.

B Ethernet hubs and repeaters learn addresses by looking at the addresses of packets as they pass by.

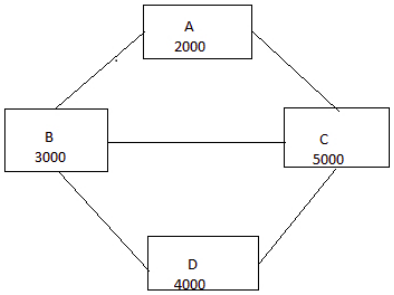
C A correctly operating Ethernet switch never sends a packet to the wrong outgoing port.

D Ethernet switches learn addresses by looking at the source address of packets as they pass by. Correct Option

Solution: (D)
Ethernet frame contains the source address, therefore, ethernet switches learn addresses by looking at the source addresses as they pass from the switch.
Hub is the passive device is just broadcast the data in all direction whenever data came to the hub.

Q.11) Max Marks: 2

Consider the following graph with four bridges A, B, C, D. Each bridge has assigned some mac address. In the spanning tree protocol, how many blocked ports will be there?



A 1

B 2 Correct Option

Solution: (B)

Explanation: A will be the root port because it has the least value of mac address
A contains two Designated ports
B Contain one RP to the direction of A
B contains one DP to the direction of C
B contains one DP to the direction of D
C contains 1 RP to the direction of A
C contains one BP to the direction of D
C contains one BP to the direction of B

C 3

D 4

Q.12) Max Marks: 2

What is the percentage overhead while sending the data W X ESC Y ESC FLAG FLAG Z. Consider W, X, ESC, Y, FLAG, Z are all of size 8 bits.?[Note: Write your answer correct up to two places of decimals]

Correct Answer

Solution: (42.85)

Solution :
Original data= W X ESC Y ESC FLAG FLAG Z= 8 * 8= 64 bits
Stuffed data for sending =
FLAG W X ESC ESC Y ESC ESC ESC FLAG ESC FLAG Z FLAG = 14 * 8= 112
Percentage overhead= [(Stuffed data – original data)/ Total data] * 100
= [(112 -64)/112] *100= 42.85%

Q.13) Max Marks: 2

Compute the fraction of the bandwidth that is wasted on overhead (headers and retransmissions) for protocol 6 on a heavily-loaded 50-kbps satellite channel with data frames consisting of 40 headers and 3960 data bits. Assume that the signal propagation time from the earth to the satellite is 270 msec. ACK frames never occur. NAK frames are 40 bits. The error rate for the data frame is 1 percent, and the error rate for NAK frames is negligible. The sequence number is 8 bits.

A 5

B 6

C 2 Correct Option

Solution: (C)
With a 50-kbps channel and 8-bit sequence numbers, the pipe is always full.
In 100 frames one frame is wasted = Header + data = 4000 bits wastage
Header wastage in 100 frames= 40 x 100 = 4000 bits
Once every 100 frame= 40 bit is wasted in NAK
Useful data= 3960 x 100
Overhead total = 8040
Percentage wastage bandwidth= Overhead / Total = [8040 / (396000 + 8040)] = 1.99 %

D 3

Q.14) Max Marks: 2

If the TCP round-trip time, RTT, is currently 30 msec and the following acknowledgments come in after 36, 26, and 34 msec, respectively, what is the new RTT estimate using the Jacobson algorithm? Use α=0.7 [correct up to two places of decimal]

Correct Answer

Solution: (31.24)

IRTT = 30 msec

NRTT= 36, 26,34 [Given]

ERTT= α * IRTT (1 - α) * NRTT

ERTT1 = 0.7 * 30 + (1 – 0.7) * 36 = 31.8

ERTT2 = 0.7 * 31.8 + (1 – 0.7) *26 = 30.06

ERTT3 = 0.7 * 30.06 + (1- 0.7) * 34 = 31.24

The new round trip time is 29.256 msec

Q.15) Max Marks: 2

Consider a subnet with prefix 128.119.40.128/26. Give an example of the range of IP addresses (of form xxx.xxx.xxx.xxx) that can be assigned to this network. Suppose an ISP owns the block of addresses of the form 128.119.40.64/26. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the second ?

A 128.119.40.128/26 to 128.119.40.191/26 and 128.119.40.64/28

B 128.119.40.64/26 to 128.119.40.127/26 and 128.119.40.80/28

C 128.119.40.128/26 to 128.119.40.191/26 and 128.119.40.80/28 **Correct Option**

Solution: (C)
128.119.40.128/26 =Subnet id
Mask no = 26,
The binary representation of last octet 128= 10 000000 First address, here starting two bits of the last octet belongs to subnet bits.
Last address of last octet 191= 10 111111
The range will be 128.119.40.128/26 to 128.119.40.191/26

ISP has the block 128.119.40.64/26
Mask =26
Last octet= 64= 01 000000. Where starting two bits belong of 64 belongs to network bits.
We want to create the four subnets so 2 bits are required.
64= 01 00 0000= First subnet
80= 01 01 0000= second subnet
Now our mask number will be 26 + 2= 28 because of the extra two subnet bits
Second subnet id is 128.119.40.80/28

D 128.119.40.64/26 to 128.119.40.127/26 and 128.119.40.64/28

Q.16) Max Marks: 2

Which of the following will be the subnet mask if DBA of the subnet is 193.52.68.15?

A 255.255.255.240

B 255.255.255.248 **Correct Option**

Solution: (B)

193 belongs to Class C, So subnet bits will be from the last octet
Check for option A
Last octet 15= 0000 1111
Last octet of subnet mask 'A' 240 = 1111 0000
When we perform AND operation between DBA and Subnet mask
193.52.68.0000 0000. Here this case fails because subnet bits cannot be 0000.
Checking for option B
Last octet of DBA 15= 0000 1111
The last octet of subnet mask 'B' 248= 11111 000
When we perform AND operation between last octet and DBA
193.52.68.00001 000. This is possible because 00001 can be possible as subnet and also DBA is valid.

C Both A and B.

D None of these.

Q.17) Max Marks: 2

Which of the following are true statements about TCP:

St 1:The Slow-Start algorithm increases a source's rate of transmission faster than "additive increase".

St: 2: A source's retransmission timeout value (RTO) is always set equal to the measured RTT.

St: 3 :If RTO is too small, it might lead to unnecessary retransmissions.

A All statements are true

B Only statement 3 is true.

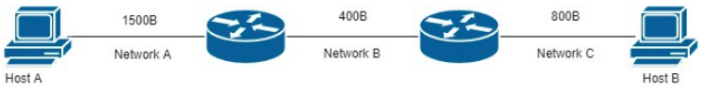
C Only Statements 1, 2 are true

D Only statement 1 , 3 are true — Correct Option

Solution: (D)
St 1: This is correct because the slow start will grow exponentially after multiplying with two every time.
St 2: RTO is always set twice of the measured RTT.
St 3: This is true if timeout value is small then there will be more number of transmissions

Q.18) Max Marks: 2

Consider a network X, Y, Z respectively. The host A sends the data to the Host B. The network X, Y, Z have MTU of 1500 B, 400 B, 800 B (MTU includes header size). The size of the header is 20B. What is the fragment offset of the last fragment received at host B? The size of data is 1480 B without header?



Correct Answer

Solution: (141)

For the first network A, there will be no fragment because of MTU 1500 B.
For second network MTU is 400 B. = 1480/380 = 3.8 4 fragments
First fragment= 376 + 20(header), fragment offset= 0 - 46
Second fragment= 376 + 20 (header), fragment offset= 47 - 93
Third fragment = 376 + 20 (header), fragment offset = 94 - 140
Fourth fragment = 352 + 20(header), fragment offset= 141-184
For the third network C there will be no further fragment because all the fragments are less than 800.
So, last fragment offset is 141

Q.19) Max Marks: 2

The congestion window size of the TCP is 60 KB using AIMD for congestion control and the size of MSS is 2 KB. The propagation delay is 10 msec. How much time it will take to get the congestion window of 40 KB?

Correct Answer

Solution: (180)
Initial thereshold= 60/2 = 30 KB
Propagation delay = 10 msec , So RTT= 20 msec
1st: 2 KB
2nd: 4KB
3rd: 8 KB
4th: 6 KB
5th: 30 KB (Threshold reached)
6th: 32 KB
7th: 34 KB
8th: 36 KB
9th: 38 KB
10th: 40 KB (Reached the 40 KB)

So the number of Round trips = 9, RTT= 20 msec
Time taken to reach the 40 KB= 9 x 20 = 180 m sec

Q.20) Max Marks: 2

Which of the following is true about differential manchester encoding?

a. Always a transition in the middle of the interval. No transition at the beginning of interval=1 and Transition at the beginning of interval = 0
b. Differential Manchester toggles the waveform whenever continuous "1" arrives in the Manchester encoding.
c. In differential Manchester encoding if next bit the same as current bit we will not toggle the waveform. If the next bit is different from the current bit then we will invert the waveform.

A All are true

B Only a,c are true

c Only b,c is true

d Only a, b is true. Correct Option

Solution: (D)

a. This true always transition occurs in the middle of the interval
b. This is true whenever one arrives at the waveform toggles in diff manchester.
c. This is false if two continuous one arrives we toggle the waveform.

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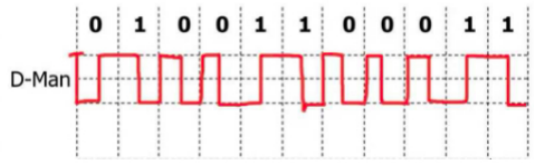

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