Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

TOPICWISE : COMPUTER NETWORKS-1 (GATE - 2019) - REPORTS

OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

ALL(17) | CORRECT(4) | INCORRECT(5) | SKIPPED(8)

Q. 1

In a block of addresses, we know the IP address of one of the host is 128.44.82.16 / 25. Which of the following represent first address and last addresses that can be assign to host in the block?

Solution Video | Have any Doubt ?

A
128.44.82.0 and 128.44.82.126

B
128.44.82.1 and 128.44.82.127

C
128.44.82.1 and 128.44.82.126

Correct Option

Solution :
(c)
IP IP of block: 128.44.82.16 /25
Subnet mask: 255.255.255.128
Perform 'AND' operation between IP of block and subnet mask to get subnet id.

```
128.44.82.16
255.255.255.128
---------------
128.44.82.0
---------------
```

First assigned address to host: 128.44.82.1
Last assigned address to host: 128.44.82.126
128.44.82.0 is subnet id and 128.44.82.127 is direct broadcast address, so cannot assigned to any host.

D
128.44.82.0 and 128.44.82.127

Your answer is **Wrong**

QUESTION ANALYTICS

Q. 2

Let $g(x) = x^3 + x^2 + 1$. Consider the information bits (1, 1, 0, 1, 1, 0). Find the codeword corresponding to these information bits if $g(x)$ is used as the generating polynomial.

Solution Video | Have any Doubt ?

A
110110111

Your answer is **Correct**

Solution :
(a)

```
      100011
1101)110110000(
     1101
     ----
      0001
      0000
      ----
       0010
       0000
       ----
        0100
        0000
        ----
         1000
```

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

B
110110110

C
110110100

D
110110101

QUESTION ANALYTICS

Q. 3

Consider the following statements:

S_1 : IEEE 802.11 does not uses sequence number.
S_2 : The amount of data send in one time in limited by RTS frame (data = sender's data + ACK).
S_3 : IEEE 802.11 uses CSMA/CA medium access protocol.
S_4 : The exponential backoff mechanism reduces the probability of collision on retransmissions in ethernet.

Which of the following is true?

FAQ | Solution Video | Have any Doubt ?

A
Only S_1 and S_2

B
Only S_2 and S_3

Correct Option

Solution :
(b)

• Since lost frames are transmitted again and again so to remember which packet reached successfully, sequence number is used.
• RTS frame tells the amount of time data + ACK is transmitted in one go.
• IEEE 802.11 uses CSMS/CA instead of CSMA/CD.
• The exponential backoff mechanism reduces the probability of collision on retransmissions in both ethernet and in IEEE 802.11.

C
Only S_2 and S_4

D
All of the statements

Your answer is **Wrong**

QUESTION ANALYTICS

Q. 4

Match List-I (Networking devices) with List-II (property) and select the correct answer using t codes given below the lists:

List-I	List-II
A. Hub	1. Broadcast domain separator
B. Bridge	2. Collision domain separator
C. Switch	3. Broadcasting device

Codes:

	A	B	C
(a)	3	1	2

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

A
a

B
b

C
c

Your answer is **Correct**

Solution :
(c)
• Hub is the broadcasting device i.e. transmitted data in all direction which can leads to collision.
• Bridge is the collision domain separator i.e. reduced collision domain.
• Switch is the collision domain separator as well as broadcast domain separate.

D
d

QUESTION ANALYTICS

Q. 5

Which of the following risk may arise, when same key is used to encrypt directions of a communication channel, that are not present if using different keys in both direction?

Solution Video | Have any Doubt ?

A
Reflection attack

Correct Option

Solution :
(a)
Reflection attacks are attack that use the same protocol in both direction. If is method f attacking a challenge response authentication that uses same protocol in both direction.

B
Denial of service

Your answer is **Wrong**

C
Eavesdropping attack

D
None of these

QUESTION ANALYTICS

Q. 6

In the network 143.128.67.235 / 20, if x represent the decimal value of 3rd octet and y represent the decimal value of 4th octet of last IP address assigned to any host, then value of $x \times y$ is _____.

FAQ | Solution Video | Have any Doubt ?

20066

Correct Option

Solution :
20066
IP of network: 143.128.67.235 / 20

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

3^{rd} octet: 01001111 = 79
4^{th} octet: 111111110 = 254
So, $x \times y = 79 \times 254 = 20066$

QUESTION ANALYTICS

Q. 7

Consider a network connecting two nodes A and B having propagation delay of 6×10^4 μsec. Bandwidth of network is 150 Mbps. If each frame size is 5000 bytes and both uses Go-Back-N sliding window protocol, where maximum 100 frames can be sent at a time then the maximum possible data rate is _____ (Mbps) [Write closest integer value]. (Upto 2 decimal places)

FAQ | Solution Video | Have any Doubt ?

33.33 [33 - 34]

Correct Option

Solution :
33.33 [33 - 34]

$$\begin{aligned}
\text{Bandwidth} &= 150 \text{ Mbps} \\
\text{Frame size} &= 5000 \text{ bytes} \\
\text{Propagation delay} &= 6 \times 10^4 \text{ μsec} \\
&= 60 \times 10^{-3} \text{ sec} = 60 \text{ msec} \\
\text{So in 1RTT} &= 60 \times 2 \times 10^{-3} \times 150 \times 10^6 \text{ bits} \\
&= 18000 \times 10^3 \text{ bits}
\end{aligned}$$

But maximum bits that can be transferred in one time = 100 frame

$$= 5000 \times 8 \times 100 \text{ bits} = 4000000 \text{ bits}$$

$$\text{So, effective bandwidth} = \frac{4000000}{18 \times 10^6} \times 150 \text{ Mbps}$$

$$= \frac{4}{18} \times 150 \times 10^6 \text{ bps} = \frac{600}{18} \times 10^6 \text{ bps}$$

$$= 33.33 \text{ Mbps}$$

QUESTION ANALYTICS

Q. 8

If the sender window size is 128 using selective repeat ARQ. Then the sequence number of the frame to be send after sending 400^{th} frames is _____.

FAQ | Solution Video | Have any Doubt ?

144

Correct Option

Solution :
144

We know that for Selective Repeat ARQ = $2^{n-1} = 128$, $n = 8$
Sequence numbers: 0 to 255, 0 to 255, . . .

$$256 + \underbrace{144}_{\text{sequence. number}} = 400$$

Your Answer is 16

QUESTION ANALYTICS

Q. 9

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

3.72 [3.71 - 3.73]

Correct Option

Solution :
3.72 [3.71 - 3.73]

To identity multicast group 1st 4 bits are 1110, so total number of multicast address possible

$$= 2^{32-4} = 2^{28}$$

Probability of choosing same address

$$= \frac{1}{\text{Total adresses for multicast}}$$

$$= \frac{1}{2^{28}} = 2^{-28}$$

$$= 3.72 \times 10^{-9}$$

QUESTION ANALYTICS

Q. 10

Computer A has 30 MB to send on a network and transmits the data in burst at 6 Mbps. The maximum transmission rate across routers in the network is 4 Mbps. If computer A's transmission is shaped using a leaky bucket. What is the capacity that the queue in the bucket must hold so that no data is discarded?

Solution Video | Have any Doubt ?

A
2 MB

B
5 MB

C
8 MB

D
10 MB

Correct Option

Solution :
(d)

$$\text{Total data} = 30 \times 8 \text{ Mb}$$

$$\text{Time for computer to transmit data} = \frac{30 \times 8 \text{ Mb}}{6 \text{ Mb}} \text{sec} = 40 \text{sec}$$

Maximum transmission rate = 4 Mbps.
Actual data sent on network in 40 sec

$$= 4 \text{ Mbps} \times 40 = 160 \text{ Mb} = 20 \text{ MB}$$

$$\text{Bucket size} = 30 \text{ MB} - 20 \text{ MB} = 10 \text{ MB}$$

QUESTION ANALYTICS

Q. 11

Which of the following is true?

Solution Video | Have any Doubt ?

A
Listen ( ) is used on the server side and causes a bound TCP socket to enter listening state.

Your answer is **Correct**

Solution :
(a)

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

attempt to establish a new TCP connection.

- Accept ( ): Accepts a received incoming attempt to create a new TCP connection from remote client.

B

Connect ( ) is used on the server side, and associates a socket with a socket address structure.

C

Bind ( ) is used on the client side, and assigns a free local port number to the socket.

D

Accept ( ) causes the system to release resources allocated to a socket.

QUESTION ANALYTICS

Q. 12

Which of the following is true?

FAQ | Solution Video | Have any Doubt ?

A

A secure hash function will not produce any collisions.

B

A cyptographic hash function is deterministic i.e. given the same input, it always produce same output.

Correct Option

Solution :
(b)
(a) A secure hash function may produce collision.
(b) A cryptographic hash function is deterministic.
(c) DHCP requests are broadcast, regardless of networking technology. Hence cannot be protected against DHCP spoofing attacks.

C

Host that use DHCP on a wired networking technology such as Ethernet are protected against possible DHCP spoofing attacks.

D

Both (b) and (c)

QUESTION ANALYTICS

Q. 13

Consider the following statements about digital signatures:

S_1 : It is impossible to produce a document that differs from the original document with single bit change and valid signature.
S_2 : Digital signature is based on asymmetric key cryptography or public cryptography.
S_3 : Any person who knows the secret information can create the signature.
Which of the following is true?

Solution Video | Have any Doubt ?

A

Only S_1 and S_3

B

Only S_2 and S_3

C

Only S_1 and S_3

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

Correct Option

Solution :
(d)
• In digital signature, even if single bit change is there in original document then it is impossible to produce document with valid signature.
• Public key cryptography used in digital signature.
• The signature can be crated by anyone who knows recreate information.

QUESTION ANALYTICS

Q. 14

Consider GBN protocol in which sender window size (SWS) is 5 and receiver window size (RWS) is 5. Suppose client sends date 0, 1, 2, 3, 4 and only data packet 2 is lost and all ACKs are lost.

What will be the contents in the receiver window and sender window before sender's timeout value expires?

Solution Video | Have any Doubt ?

A
Sender window : 01234 and Receiver window : 01234

B
Sender window : 23456 and Receiver window : 01234

Your answer is **Wrong**

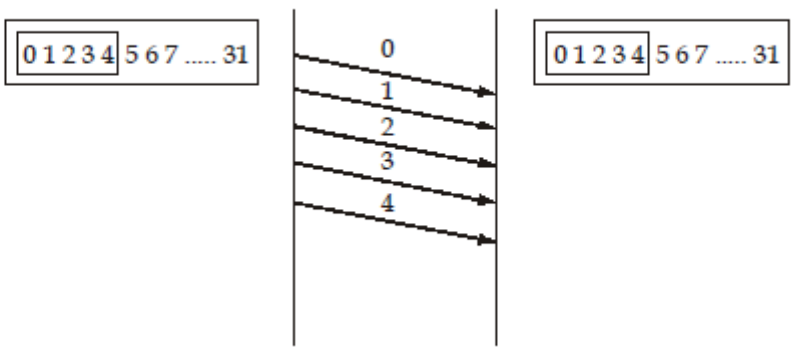
C
Sender window : 23456 and Receiver window : 23456

D
Sender window : 01234 and Receiver window : 23456

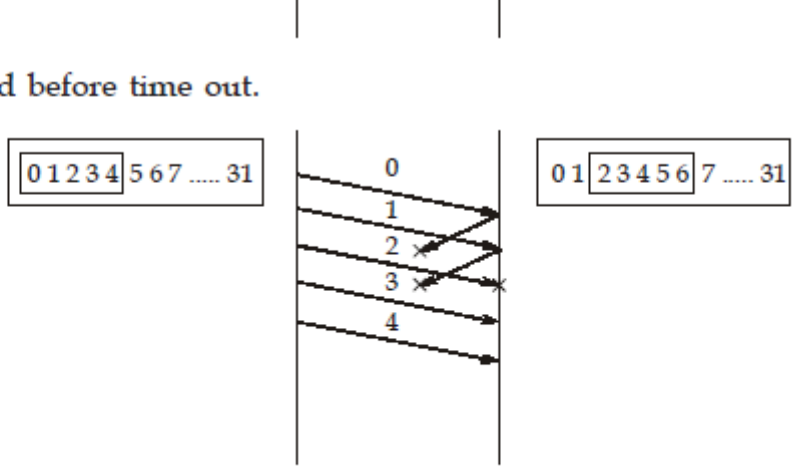
Correct Option

Solution :
(d)

Before sending



After sending and before time out.



Sender window will be 0, 1, 2, 3, 4 and Receiver window will be 2, 3, 4, 5, 6.

QUESTION ANALYTICS

Q. 15

Let N stations share 60 kbps of slotted aloha channel. Frame size is 1024 bits which are send at every 40 seconds. The value of N is _____. (Upto 1 decimal places)

FAQ | Solution Video | Have any Doubt ?

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

Solution :
862.5 [862.0 - 863.0]

Throughput of slotted aloha = $G \times e^{-G}$

Maximum throughput is achieved when $G = 1$

$$N \times L = 0.368 \times \text{Channel capacity}$$

$$N \times \frac{1024}{40} = 0.368 \times 60 \times 10^3$$

$$N = \frac{0.368 \times 60 \times 10^3 \times 40}{1024}$$

$$= 862.5$$

QUESTION ANALYTICS

Q. 16

Consider two nodes A and B on the same ethernet segment, and suppose the propagation delay between the two nodes is 225 bit times. Suppose at time both nodes A and B begin to transmit a frame. Assume both nodes transmit a 50-bit jam signal after detecting a collision. For 10^7 bits per set ethernet, the time at which both nodes A and B sense an idle channel is _____ µsec.

Solution Video | Have any Doubt ?

50

Your answer is **Correct** 50

Solution :
50

Step 1: Both nodes detect a collision at time t = 225
Step 2: Jam signal has 50-bit
Both nodes stop transmits their jam signal at the time t = 225 + 50 = 275
Step 3: The last bit of the jam signal from B arrives at A after 225 bit times, so 275 + 225 = 500.
(Similarly, the last bit of the jam signal from A arrives at B after 225 bit times, so 275 + 225 = 500 bit times)
At 500 bit times, both sense an idle channel.
For 107 bps ethernet,
The time taken for 500 bits:

$$= \frac{500 \text{ bits}}{10^7 \text{ bits/sec}} = 50 \text{ µsec}$$

QUESTION ANALYTICS

Q. 17

In an RSA system, the public key of given user is $e = 31$ and $n = 3599$. The private key of user will be _____.

FAQ | Solution Video | Have any Doubt ?

3031

Correct Option

Solution :
3031

We know that, $n = p \times q$

Where p and q are prime number.

So, by hit and trial method (by checking only prime number)

$$3599 = 59 \times 61$$

So, p and q can be any one from 59 or 61.

$$\phi(n) = (59 - 1) \times (61 - 1) = 58 \times 60 = 3480$$

We know that,

$$ed = 1 \bmod \phi(n)$$

$$31 \times d = 1 \bmod 3480$$

We can write it as and solve for 'x':

Ashima Garg
Course: GATE
Computer Science Engineering(CS)

HOME
MY TEST
BOOKMARKS
MY PROFILE
REPORTS
BUY PACKAGE
ASK AN EXPERT
OFFER
EXCLUSIVE OFFER FOR OTS STUDENTS ONLY ON BOOK PACKAGES

$8 = 1 \times 7 + 1$

Write last one as:

$$8 - 1 \times 7 = 1$$

$$8 - 1 \times (31 - 3 \times 8) = 1$$

$$(3480 - 112 \times 31) - 1 \times (31 - 3 \times (3480 - 112 \times 31)) = 1$$

Make above equation in terms of 31 and 3480

$$3480 - 112 \times 31 - 1 \times 31 + 3 \times 3480 - 336 \times 31 = 1$$

$$4 \times 3480 - 449 \times 31 = 1$$

$$(-449) \times 31 + 4 \times 3480 = 1$$

We conclude $d = -449$; is infect 3031 mod 3480.

So, $d = 3031$

QUESTION ANALYTICS