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-2 (GATE - 2019) - REPORTS

OVERALL ANALYSIS COMPARISON REPORT SOLUTION REPORT

ALL(17) CORRECT(4) INCORRECT(6) SKIPPED(7)

Q. 1

Consider the following statements about IPv4 and IPv6:
S_1 : In IPv6 broadcasting and multicasting uses as message transmission scheme.
S_2 : In IPv4 fragmentation done by intermediate router while in IPv6 fragmentation done by sender only.
S_3 : In IPv4 Checksum is used as error detecting technique, where as in IPv6 CRC is used.
Which of the following is true?

Solution Video | Have any Doubt ?

A
S_1 and S_2 only

B
S_2 and S_3 only

C
S_2 only

Correct Option

Solution :
(c)
• IPv6 does not have broadcasting concept and fragmentation is done by sender only but in IPv4 fragmentation can be done at intermediate router.
• IPv4 uses checksum as error detecting technique while IPv6 has actually dropped error detection on packets because it assumes that the layers above and below it will perform error detection.

D
S_1 and S_3 only

QUESTION ANALYTICS

Q. 2

Which of the following Application Layer Protocol cannot be used between mail server and receiver's client machine?

Solution Video | Have any Doubt ?

A
HTTP

Your answer is **Wrong**

B
SMTP

Correct Option

Solution :
(b)
• POP3 and $IMAP_4$ are well known pull protocols used between receiver's client and mail server.
• In Web Based Protocol, HTTP is work as push and pull protocol.
• SMTP is well known push protocol, it cannot be used between receiver's client and mail server.

C
POP3

D

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

Q. 3

Ramesh buy a new laptop, he connected it to Ethernet and after sometime he wishes to surf the internet, so laptop send a DNS request. What will be the sequence of header packet geenrated on request, as it leaves the laptop?

FAQ | Solution Video | Have any Doubt ?

A
UDP, DNS, IP

Your answer is **Wrong**

B
Ethernet, IP, UDP, DNS

Correct Option

Solution :
(b)
• 1st packet that waves will be Ethernet.
• 2nd packet will be UDP packet before DNS request.
• 3rd packet will be DNS request packet.
• 4th will be IP packet.
Note: Before DNS request, UDP packet is sent and DNS uses UDP as transport layer protocol but not TCP.

C
Ethernet, IP, TCP, DNS

D
UDP, DNS, Ethernet, IP

QUESTION ANALYTICS

Q. 4

Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I	List-II
P. Retransmission Timer	1. Used to deal with zero window size deadlock situation
Q. Persistent Timer	2. Used to prevent long idle connection.
R. Time Wait Timer	3. Used to retransmit lost segments.
S. Keep Alive Timer	4. Used for TCP connection termination

Codes:

	P	Q	R	S
(a)	1	2	3	4
(b)	2	1	4	3
(c)	3	1	4	2
(d)	3	4	1	2

Solution Video | Have any Doubt ?

A
a

B
b

C
c

Your answer is **Correct**

Solution :
(c)
• Retransmission Timer is used to retransmit last segments, when either packet lost or ACK lost.
• Persistent Timer is used to deal with a zero-window size deadlock situation.
• Keep alive time is used to prevent long idle connection between two TCP's

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

d

QUESTION ANALYTICS

Q. 5

Which of the following is true?

Solution Video | Have any Doubt ?

A
When an IP router between two ethernet segments forwards an IP packet, it does not modify the destination IP address.

Your answer is **Correct**

Solution :
(a)
• When an IP router between two ethernet segments forwards an IP packet, it does not modify the destination IP address but can change the MAC address. Infact, source and destination IPs are never changed.
• IPv4 uses time to live field to prevent looping when due to some errors in routing table packet start looping in network.

B
When an IP router between two ethernet segments forwards an IP packet, it does not modify the destination MAC address.

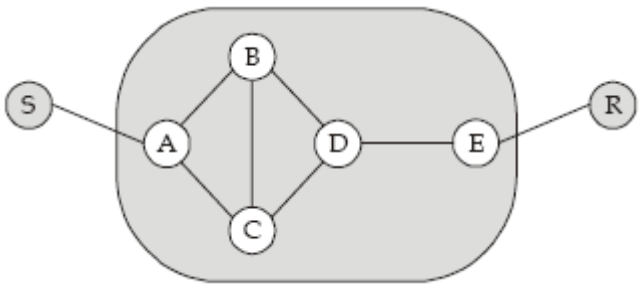
C
If there are some errors in routing table at any router, then it is possible that a packet loops forever in IPv4.

D
Both (a) and (c)

QUESTION ANALYTICS

Q. 6

Consider the network given below:



If flooding is used to send packets from A to E, then the total number of packets generated in the above network when hop count for A to E is 3 are _____.

Solution Video | Have any Doubt ?

14

Correct Option

Solution :
14
1. A send 2 packets i.e. B and C.
2. B send 2 packets i.e. C and D, C send 2 packets i.e. B and D.
3. C send 2 packets i.e. A and D, B send 2 packets i.e. A and D, D send 2 packets i.e. C and send 2 packets i.e. B and E.

Total packets = 2 × 7 = 14

QUESTION ANALYTICS

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

Propagation speed of fiber is 2×10^{8} msec with length 1 Km. Assume error free and duplex communication with ACK packet size 64 B. Then the value of N that yields maximum utilization of sender is _____.

FAQ | Solution Video | Have any Doubt ?

4

Correct Option

Solution :
4

$$\text{Transmission Time } (T_t) \text{ of packet} = \frac{512 \text{ B}}{1 \text{ Gbps}} = 4096 \times 10^{-9} \text{ sec} = 4.096 \ \mu\text{sec}$$

$$\text{Transmission Time } (T_t) \text{ of ACK} = \frac{64 \text{ B}}{1 \text{ Gbps}} = 512 \times 10^{-9} \text{ sec} = 0.512 \ \mu\text{sec}$$

$$\text{Propagation Time } (P_t) = \frac{1000 \text{ m}}{2 \times 108 \text{ msec}} = 5 \ \mu\text{sec}$$

So, for maximum utilization:

$$1 = \frac{\text{T.T. (Packet)} \times \text{N}}{\text{T.T.(Packet)} + 2\text{P.T.} + \text{T.T. (ACK)}}$$

$$\left\lceil \frac{\text{T.T. (Packet)} + 2 \times \text{PT} + \text{TT (ACK)}}{\text{T.T. (Packet)}} \right\rceil = \text{N}$$

$$\left\lceil \frac{4.096 + 2 \times 5 + 0.512}{4.096} \right\rceil = \text{N}$$

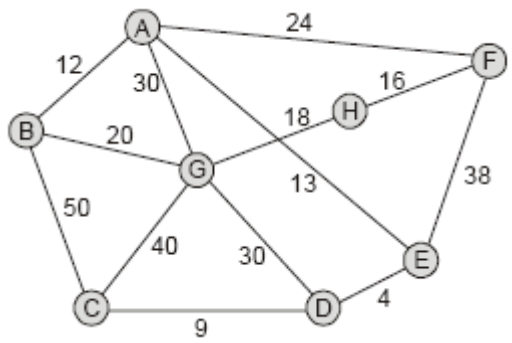
$$\lceil 3.56 \rceil = \text{N}$$

$$4 = \text{N}$$

QUESTION ANALYTICS

Q. 8

Consider a network with 8 routers A to H connected with links having weights as shown in the following diagram:



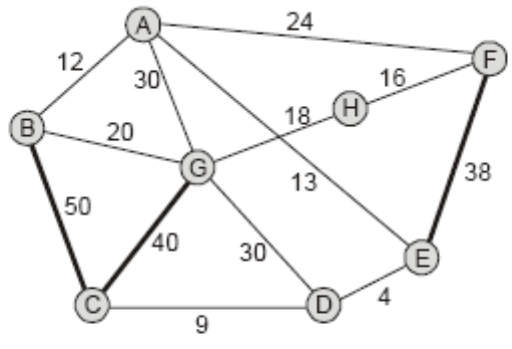
All the routers use the distance vector based routing algorithm to update their routing tables.
Each router starts with its routing table initialized to contain an entry for each neighbour with the weight of the respective connecting link. After all the routing tables stabilize, the number of links in the network will never be used for carrying any data are _____.

Solution Video | Have any Doubt ?

3

Correct Option

Solution :
3



After stabilizing all the routing table linked BC (50), CG (40), EF (38) are not used since to

Your Answer is 1

QUESTION ANALYTICS

Q. 9

Consider an IPv4 network, each host can generate packet with a rate of 500 packet per second. If each host in network is identified by unique identification number 48 bits, then the host wrap around time for generating packet will be _____ (in sec). [Closest integer value]

Have any Doubt ?

132 [131 - 132]

Correct Option

Solution :
132 [131 - 132]
Size of IP address of IPv4 is 32 bits.
So number of host present on network = 2^{32}.
Each host generate 500 packet in 1 second (simultaneously).
Number of packet will be number of host on × Number of packet network generated.

$$= 2^{32} \times 500$$

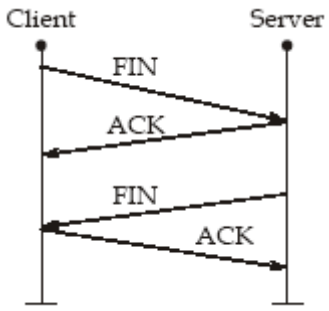
We have unique identification number of 48 bits. So number of hosts = 2^{48}.
So time to generate host wrap around

$$= \frac{2^{48}}{2^{32} \times 500} = \lceil 131.07 \rceil = 132$$

QUESTION ANALYTICS

Q. 10

Consider Three-way Handshaking for TCP connection termination is shown below:



Which of the following is false?
S_1 : Loss of ACK from client doesn't effect on termination of connection.
S_2 : The client moves FIN-Wait-1 → FIN-Wait-2 → closed in the state machine on no packet loss.
S_3 : Loss of ACK from server restrict termination of connection.

FAQ | Solution Video | Have any Doubt ?

A
S_1 and S_2 only

B
S_2 and S_3 only

Correct Option

Solution :
(b)
• Loss of ACK from client does not effect on termination of connection because client use timeout timer, after it expire it send "ACK" and goes in closed state, where if server does not receive "ACK" then its timer expire and send FIN segment one more time and termination of connection. So True
• Client moves FIN-Wait-1 → FIN-Wait-2 → Timeout → Closed. So False
• Loss of ACK from server does not effect since when client receive FIN from server, then the client understand that "ACK" was lost. So False

C

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

S_2 only

QUESTION ANALYTICS

Q. 11

Consider the following statements about TCP congestion window:
S_1 : In slow start, a sender doubles its window size every RTT if all sent packets were acknowledged.
S_2 : After detecting packet loss through a timeout, TCP halves its window size as a response to the path congestion.
S_3 : In congestion avoidance state, sender increase its window size by one packet for each acknowledgment.
Which of the following is true?

Solution Video | Have any Doubt ?

A
S_1 and S_2 only

B
S_2 only

C
S_1 only

Correct Option

Solution :
(c)
• In slow start phase, sender doubles its window size every RTT if all sent packets were acknowledged.
• After detecting packet loss through a timeout. TCP reset its window size to 1 MSS.
• In congestion avoidance state, sender increase its window size by 1 MSS instead of one packet (Packet) for every RTT.

D
S_1 and S_3 only

Your answer is **Wrong**

QUESTION ANALYTICS

Q. 12

Consider an instance of TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm where the window size at the start of slow start phase is 1 MSS and the threshold at the start is 1st transmission is 16 MSS.
Assume TCP use over a lossy link i.e., timeout occur after transmission of 7th packet . What is the congestion window size at the end of 14 RTT (in MSS)?

Solution Video | Have any Doubt ?

A
9

B
11

Your answer is **Wrong**

C
12

Correct Option

Solution :
(c)

RTT No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Cong. window	1	2	4	8	16	17	18	1	2	4	8	9	10	11
Threshold	16	16	16	16	16	16	16	9	9	9	9	9	9	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

D
14

QUESTION ANALYTICS

Q. 13

Which of the following is true?

Solution Video | Have any Doubt ?

A
The count to infinity problem may arise in distance vector routing protocol when network gets disconnected.

B
The "path vector" enhancement to a distance vector protocol always enables the protocol to converge without counting to infinity.

C
The count to infinity problem may arise in distance vector routing protocol even when the network never get disconnected.

D
Both (a) and (b)

Your answer is **Correct**

Solution :
(d)
• Count to infinity problem in distance vector routing protocol arise when network gets disconnected. But this problem doesnot occur in such cases when the network not get disconnected.
• To make distance vector routing protocol coverage without count to infinity problem, enhancement to distance vector routing protocol is used i.e. path vector routing.

QUESTION ANALYTICS

Q. 14

Consider an IP router with Maximum Transferable Unit (MTU) of 500 B has received an IP datagram of size 3000 B with an IP header of length 15 B. Which of the following is true about IP fragments generated by router for this packet?

Solution Video | Have any Doubt ?

A
Number of fragments = 6, last fragment offset and datagram length 306 and 120

B
Number of fragments = 7, last fragment offset and datagram length 300 and 120

C
Number of fragments = 7, last fragment offset and datagram length 360 and 120

Your answer is **Correct**

Solution :
(c)
Maximum Transferable Unit = 500 B
Data bytes that can be transfered in 1 fragment = 500 – 15 = 485

$$\text{Number of fragments} = \left\lceil \frac{3000-15}{480} \right\rceil$$

$$= \left\lceil \frac{2985}{480} \right\rceil = \lceil 6.218 \rceil = 7$$

Since 485 is not divided by 8. So, 480 is sent in one fragment
1st fragment = offset = 0, datagram length = 480 + 15 = 495
2nd fragment = offset = 60, datagram length = 480 + 15 = 495

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

6^{th} fragment = offset = 300, datagram length = 480 + 15 = 495
7^{th} fragment = offset = 360, datagram length = 105 + 15 = 120

D
Number of fragments = 6, last fragment offset and datagram length 300 and 120

QUESTION ANALYTICS

Q. 15

Consider Amit lives in Delhi, connected to the internet via a 100 Mbps connection retrieve a 250 KB webpage from server in Bangalore, where page contain 3 images of 500 KB each. Assume one way propagation delay is 75 ms and Amit's access link is the bandwidth bottleneck for this connection. If T_1 is the time taken for the page with images to appear on Amit's screen using nonpersistent HTTP and T_2 is time using persistent connection, then $T = T_1 - T_2$ will be _____ msec.
(Assuming queuing delay is zero)

Solution Video | Have any Doubt ?

750

Correct Option

Solution :
750

Using Non-Persistent Connection:

$$\text{Time } (T_1) = [2\text{ RTT}] \times \text{Number of time connection established} + \text{Transmission}$$

$$= \underbrace{2}_{\text{Images}} \times \underbrace{(3+1)}_{\substack{\text{Connection}\\ \text{established}}} \times \underbrace{2 \times 75\text{ ms}}_{\text{RTT}} + \frac{(500\text{ KB} \times 3 + 250\text{ KB})}{100\text{ Mbps}}$$

$$= 2 \times (600)\text{ ms} + \frac{(12\text{ Mb} + 2\text{ Mb})}{100\text{ Mbps}}$$

$$= 1200\text{ msec} + 140\text{ msec}$$

$$= 1340\text{ msec}$$

Using Persistent Connection:

$$\text{Time } (T_2) = [3\text{ RTT} + \text{Transmission Time}]$$

$$= \underbrace{3}_{\text{3 Images}} \times \underbrace{(2 \times 75)}_{\text{RTT}}\text{ msec} + \frac{(4\text{ Mb} + 2\text{ Mb})}{100\text{ Mbps}}$$

$$= 450\text{ msec} + 140\text{ msec}$$

$$= 590\text{ msec}$$

$$\text{Time } (T) = T_1 - T_2$$

$$= 1340 - 590 = 750\text{ msec}$$

QUESTION ANALYTICS

Q. 16

Consider Shubhani wants to transfer file from host A to host B connected via a link with 10 Mbps bandwidth. Shubhani choose maximum file size to transfer with maximum segment size 1460 B. If total 66 bytes of transport, network and data link layer header are added to each segment before packet is sent over link, then the time to transmit a file is _____ minutes. (Closest integer value)

Solution Video | Have any Doubt ?

60 [59 - 60]

Correct Option

Solution :
60 [59 - 60]

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

$\lceil 1460 \rceil$

$$\begin{aligned}
\text{Header size send} &= 294, 175, 8 \times 66 \text{ B} \\
&= 194, 156, 028 \text{ B} \\
\text{Total data sent} &= 2^{32} + 194, 156, 028 \text{ B} \\
&= 429, 496, 729, 6 + 194, 156, 028 \text{ B} \\
&= 448, 912, 332, 4 \text{ B} \\
&= 359, 129, 865, 92 \text{ bits} \\
&= 35919.986592 \times 10^6 \text{ sec}
\end{aligned}$$

$$\text{Time needed to sent} = \frac{35919.986592 \times 10^6}{10 \times 10^6 \text{ bps}} = 3591.9986592 \text{ sec}$$

$$= \lceil 59.854 \rceil \text{ min} = 60$$

QUESTION ANALYTICS

Q. 17

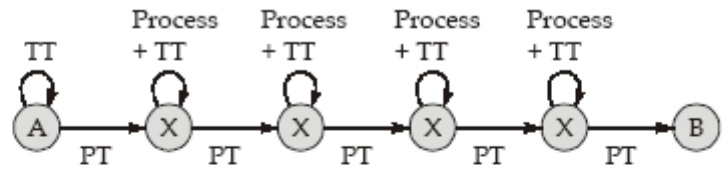
Consider two nodes, A and B are attached to opposite ends of an 1200 meter cable with signal propagation speed is 2×10^8 m/sec. Frame size used by both nodes is 1500 bits including header and preambles. Assume transmission rate is 100 Mbps and there are four switches between node A and B each insert 20 bit delay as a processing time in addition to store and forward delay. If only A has packet to send, then the time taken to reach A's packet at B is _____ μsec. (Upto 1 decimal places)

Solution Video | Have any Doubt ?

81.8 [81.2 - 82.2]

Correct Option

Solution :
81.8 [81.2 – 82.2]



$$\text{Transmission Time} = \frac{1500 \text{ Bits}}{100 \text{ Mbps}} = 15 \text{ μsec}$$

$$\text{Propagation Time} = \frac{1200 \text{ m}}{2 \times 10^8 \text{ m/sec}} = 6 \text{ μsec}$$

$$\text{Processing Time} = \frac{20 \text{ Bits}}{100 \text{ Mbps}} = 0.2 \text{ μsec}$$

Cable is divided in 5 parts, so propagation delay between entry two points is

$$= \frac{6 \text{ μsec}}{5} = 1.2 \text{ μsec}$$

$$\begin{aligned}
\text{So, time taken at 1}^{st}\text{ switch} &= 15 + 1.2 + 0.2 \\
&= 16.4 \text{ μsec} \\
\text{Time at switches} &= 16.4 \times 4 \\
&= 65.6 \text{ μsec} \\
\text{Total Time} &= \text{Time at switch} + \text{Time at node A} \\
&= 65.6 \text{ μsec} + 15 + 1.2 \\
&= 81.8 \text{ μsec}
\end{aligned}$$

Your Answer is 75206

QUESTION ANALYTICS