TOPIC : DATA COMMUNICATIONS AND NETWORKING (UG 5th SEM. MAJOR 3 PAPER)

PREVIOUS YEAR GATE QUESTIONS FROM 2025 - 2015

2025

Q.22	Consider the 3-way handshaking protocol for TCP connection establishment. Let the three packets exchanged during the connection establishment be denoted as P1, P2, and P3, in order. Which of the following option(s) is/are TRUE with respect to TCP header flags that are set in the packets?
(A)	P3: SYN = 1, ACK = 1
(B)	P2: SYN = 1, ACK = 1
(C)	P2: SYN = 0, ACK = 1
(D)	P1: SYN = 1

Q.16	Identify the ONE CORRECT matching between the OSI layers and their corresponding functionalities as shown.

OSI Layers	Functionalities
(a) Network layer	(I) Packet routing
(b) Transport layer	(II) Framing and error handling
(c) Datalink layer	(III) Host to host communication

(A)	(a)-(I), (b)-(II), (c)-(III)
(B)	(a)-(I), (b)-(III), (c)-(II)
(C)	(a)-(II), (b)-(I), (c)-(III)
(D)	(a)-(III), (b)-(II), (c)-(I)

Q.40	A packet with the destination IP address 145.36.109.70 arrives at a router whose routing table is shown. Which interface will the packet be forwarded to?

Subnet Address	Subnet Mask (in CIDR notation)	Interface
145.36.0.0	/16	E1
145.36.128.0	/17	E2
145.36.64.0	/18	E3
145.36.255.0	/24	E4
Default	--	E5

(A) E3

(B) E1

(C) E2

(D) E5

Q.57	Suppose a message of size 15000 bytes is transmitted from a source to a destination using IPv4 protocol via two routers as shown in the figure. Each router has a defined maximum transmission unit (MTU) as shown in the figure, including IP header. The number of fragments that will be delivered to the destination is _____ . (Answer in integer)

Q.18	A machine receives an IPv4 datagram. The protocol field of the IPv4 header has the protocol number of a protocol X.
	Which ONE of the following is NOT a possible candidate for X?
(A)	Internet Control Message Protocol (ICMP)
(B)	Internet Group Management Protocol (IGMP)
(C)	Open Shortest Path First (OSPF)
(D)	Routing Information Protocol (RIP)

Q.23	Consider a network that uses Ethernet and IPv4. Assume that IPv4 headers do not use any options field. Each Ethernet frame can carry a maximum of 1500 bytes in its data field. A UDP segment is transmitted. The payload (data) in the UDP segment is 7488 bytes.
	Which ONE of the following choices has the CORRECT total number of fragments transmitted and the size of the last fragment including IPv4 header?
(A)	5 fragments, 1488 bytes
(B)	6 fragments, 88 bytes
(C)	6 fragments, 108 bytes
(D)	6 fragments, 116 bytes

2024

Q.65 Consider sending an IP datagram of size 1420 bytes (including 20 bytes of IP header) from a sender to a receiver over a path of two links with a router between them. The first link (sender to router) has an MTU (Maximum Transmission Unit) size of 542 bytes, while the second link (router to receiver) has an MTU size of 360 bytes. The number of fragments that would be delivered at the receiver is _____

Q.58 Consider the entries shown below in the forwarding table of an IP router. Each entry consists of an IP prefix and the corresponding next hop router for packets whose destination IP address matches the prefix. The notation "/N" in a prefix indicates a subnet mask with the most significant N bits set to 1.

Prefix	Next hop router
10.1.1.0/24	R1
10.1.1.128/25	R2
10.1.1.64/26	R3
10.1.1.192/26	R4

This router forwards 20 packets each to 5 hosts. The IP addresses of the hosts are 10.1.1.16, 10.1.1.72, 10.1.1.132, 10.1.1.191, and 10.1.1.205 . The number of packets forwarded via the next hop router R2 is _____

Q.36 Consider a network path P—Q—R between nodes P and R via router Q. Node P sends a file of size 10^6 bytes to R via this path by splitting the file into chunks of 10^3 bytes each. Node P sends these chunks one after the other without any wait time between the successive chunk transmissions. Assume that the size of extra headers added to these chunks is negligible, and that the chunk size is less than the MTU.

Each of the links P—Q and Q—R has a bandwidth of 10^6 bits/sec, and negligible propagation latency. Router Q immediately transmits every packet it receives from P to R, with negligible processing and queueing delays. Router Q can simultaneously receive on link P—Q and transmit on link Q—R.

Assume P starts transmitting the chunks at time $t = 0$.
Which one of the following options gives the time (*in seconds, rounded off to 3 decimal places*) at which R receives all the chunks of the file?

(A) 8.000

(B) 8.008

Q.31 Which of the following fields is/are modified in the IP header of a packet going out of a network address translation (NAT) device from an internal network to an external network?

(A) Source IP

(B) Destination IP

(C) Header Checksum

(D) Total Length

Q.29 TCP client P successfully establishes a connection to TCP server Q. Let N_P denote the sequence number in the SYN sent from P to Q. Let N_Q denote the acknowledgement number in the SYN ACK from Q to P. Which of the following statements is/are CORRECT?

(A)   The sequence number N_P is chosen randomly by P

(B)   The sequence number N_P is always 0 for a new connection

(C)   The acknowledgement number N_Q is equal to N_P

(D)   The acknowledgement number N_Q is equal to $N_P + 1$

Q.16   A user starts browsing a webpage hosted at a remote server. The browser opens a single TCP connection to fetch the entire webpage from the server. The webpage consists of a top-level index page with multiple embedded image objects. Assume that all caches (e.g., DNS cache, browser cache) are all initially empty. The following packets leave the user's computer in some order.

        (i)   HTTP GET request for the index page
        (ii)   DNS request to resolve the web server's name to its IP address
        (iii)   HTTP GET request for an image object
        (iv)   TCP SYN to open a connection to the web server

        Which one of the following is the CORRECT chronological order (earliest in time to latest) of the packets leaving the computer ?

(A)   (iv), (ii), (iii), (i)

(B)   (ii), (iv), (iii), (i)

(C)   (ii), (iv), (i), (iii)

(D)   (iv), (ii), (i), (iii)

Q.54   Consider a TCP connection operating at a point of time with the congestion window of size 12 MSS (Maximum Segment Size), when a timeout occurs due to packet loss. Assuming that all the segments transmitted in the next two RTTs (Round Trip Time) are acknowledged correctly, the congestion window size (*in MSS*) during the third RTT will be _____

Q.55   Consider an Ethernet segment with a transmission speed of 10^8 bits/sec and a maximum segment length of 500 meters. If the speed of propagation of the signal in the medium is 2×10^8 meters/sec, then the minimum frame size (*in bits*) required for collision detection is _____

Q.38   Which one of the following CIDR prefixes exactly represents the range of IP addresses 10.12.2.0 to 10.12.3.255?

(A)   10.12.2.0/23

(B)   10.12.2.0/24

(C)   10.12.0.0/22

(D)   10.12.2.0/22

Q.32   Which of the following fields of an IP header is/are *always* modified by any router before it forwards the IP packet?

(A)   Source IP Address

(B)   Protocol

(C)   Time to Live (TTL)

(D)   Header Checksum

Q.28   Which of the following statements about IPv4 fragmentation is/are TRUE?

(A)   The fragmentation of an IP datagram is performed *only* at the source of the datagram

(B)   The fragmentation of an IP datagram is performed at any IP router which finds that the size of the datagram to be transmitted exceeds the MTU

(C)   The reassembly of fragments is performed *only* at the destination of the datagram

(D)   The reassembly of fragments is performed at all intermediate routers along the path from the source to the destination

Q.23 Node X has a TCP connection open to node Y. The packets from X to Y go through an intermediate IP router R. Ethernet switch S is the first switch on the network path between X and R. Consider a packet sent from X to Y over this connection.

Which of the following statements is/are TRUE about the destination IP and MAC addresses on this packet at the time it leaves X?

(A) The destination IP address is the IP address of R

(B) The destination IP address is the IP address of Y

(C) The destination MAC address is the MAC address of S

(D) The destination MAC address is the MAC address of Y

2023

Q.17	Suppose two hosts are connected by a point-to-point link and they are configured to use Stop-and-Wait protocol for reliable data transfer. Identify in which one of the following scenarios, the utilization of the link is the lowest.
(A)	Longer link length and lower transmission rate
(B)	Longer link length and higher transmission rate
(C)	Shorter link length and lower transmission rate
(D)	Shorter link length and higher transmission rate

Q.25	Which of the following statements is/are INCORRECT about the `OSPF (Open Shortest Path First)` routing protocol used in the Internet?
(A)	`OSPF` implements Bellman-Ford algorithm to find shortest paths.
(B)	`OSPF` uses Dijkstra's shortest path algorithm to implement least-cost path routing.
(C)	`OSPF` is used as an inter-domain routing protocol.
(D)	`OSPF` implements hierarchical routing.

Q.50	Suppose you are asked to design a new reliable byte-stream transport protocol like TCP. This protocol, named `myTCP`, runs over a 100 Mbps network with Round Trip Time of 150 milliseconds and the maximum segment lifetime of 2 minutes. Which of the following is/are valid lengths of the **Sequence Number** field in the `myTCP` header?
(A)	30 bits
(B)	32 bits
(C)	34 bits
(D)	36 bits

Q.52 | Suppose in a web browser, you click on the `www.gate-2023.in` URL. The browser cache is empty. The IP address for this URL is not cached in your local host, so a DNS lookup is triggered (by the local DNS server deployed on your local host) over the 3-tier DNS hierarchy in an iterative mode. No resource records are cached anywhere across all DNS servers.

Let RTT denote the round trip time between your local host and DNS servers in the DNS hierarchy. The round trip time between the local host and the web server hosting `www.gate-2023.in` is also equal to RTT. The HTML file associated with the URL is small enough to have negligible transmission time and negligible rendering time by your web browser, which references 10 equally small objects on the same web server.

Which of the following statements is/are CORRECT about the minimum elapsed time between clicking on the URL and your browser fully rendering it?

(A) 7 RTTs, in case of non-persistent HTTP with 5 parallel TCP connections.

(B) 5 RTTs, in case of persistent HTTP with pipelining.

(C) 9 RTTs, in case of non-persistent HTTP with 5 parallel TCP connections.

(D) 6 RTTs, in case of persistent HTTP with pipelining.

Q.65 The forwarding table of a router is shown below.

Subnet Number	Subnet Mask	Interface ID
200.150.0.0	255.255.0.0	1
200.150.64.0	255.255.224.0	2
200.150.68.0	255.255.255.0	3
200.150.68.64	255.255.255.224	4
Default		0

A packet addressed to a destination address 200.150.68.118 arrives at the router. It will be forwarded to the interface with ID _____.

2022

GATE 2022 Computer Science and Information Technology (CS)

Q.22	Consider an enterprise network with two Ethernet segments, a web server and a firewall, connected via three routers as shown below.

What is the number of subnets inside the enterprise network?

(A)	3
(B)	12
(C)	6
(D)	8

Q.35	Consider the resolution of the domain name www.gate.org.in by a DNS resolver. Assume that no resource records are cached anywhere across the DNS servers and that iterative query mechanism is used in the resolution. The number of DNS query-response pairs involved in completely resolving the domain name is_____.

Q.55	Consider routing table of an organization's router shown below:

Subnet Number	Subnet Mask	Next Hop
12.20.164.0	255.255.252.0	R1
12.20.170.0	255.255.254.0	R2
12.20.168.0	255.255.254.0	Interface 0
12.20.166.0	255.255.254.0	Interface 1
default		R3

Which of the following prefixes in CIDR notation can be collectively used to correctly aggregate all of the subnets in the routing table?

(A)	12.20.164.0/20
(B)	12.20.164.0/22
(C)	12.20.164.0/21
(D)	12.20.168.0/22

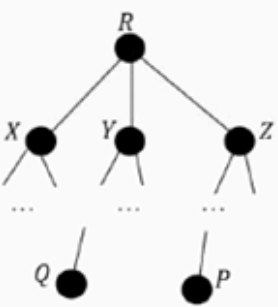|	
Q.57	Consider a network with three routers P, Q, R shown in the figure below. All the links have cost of unity. The routers exchange distance vector routing information and have converged on the routing tables, after which the link Q–R fails. Assume that P and Q send out routing updates at random times, each at the same average rate. The probability of a routing loop formation (*rounded off to one decimal place*) between P and Q, leading to count-to-infinity problem, is_____.
Q.59	Consider a 100 Mbps link between an earth station (sender) and a satellite (receiver) at an altitude of 2100 km. The signal propagates at a speed of 3×10^8 m/s. The time taken (in milliseconds, *rounded off to two decimal places*) for the receiver to completely receive a packet of 1000 bytes transmitted by the sender is_____.
Q.60	Consider the data transfer using TCP over a 1 Gbps link. Assuming that the maximum segment lifetime (MSL) is set to 60 seconds, the minimum number of bits required for the sequence number field of the TCP header, to prevent the sequence number space from wrapping around during the MSL is_____.

2021

Q.44	A TCP server application is programmed to listen on port number P on host S. A TCP client is connected to the TCP server over the network. Consider that while the TCP connection was active, the server machine S crashed and rebooted. Assume that the client does not use the TCP keepalive timer. Which of the following behaviors is/are possible?
(A)	If the client was waiting to receive a packet, it may wait indefinitely.
(B)	The TCP server application on S can listen on P after reboot.
(C)	If the client sends a packet after the server reboot, it will receive a RST segment.
(D)	If the client sends a packet after the server reboot, it will receive a FIN segment.

Q.45	Consider two hosts P and Q connected through a router R. The maximum transfer unit (MTU) value of the link between P and R is 1500 bytes, and between R and Q is 820 bytes. A TCP segment of size 1400 bytes was transferred from P to Q through R, with IP identification value as 0x1234. Assume that the IP header size is 20 bytes. Further, the packet is allowed to be fragmented, i.e., Don't Fragment (DF) flag in the IP header is *not* set by P. Which of the following statements is/are correct?
(A)	Two fragments are created at R and the IP datagram size carrying the second fragment is 620 bytes.
(B)	If the second fragment is lost, R will resend the fragment with the IP identification value 0x1234.
(C)	If the second fragment is lost, P is required to resend the whole TCP segment.
(D)	TCP destination port can be determined by analysing *only* the second fragment.

Q.49	Consider the sliding window flow-control protocol operating between a sender and a receiver over a full-duplex error-free link. Assume the following: • The time taken for processing the data frame by the receiver is negligible. • The time taken for processing the acknowledgement frame by the sender is negligible. • The sender has infinite number of frames available for transmission. • The size of the data frame is 2,000 bits and the size of the acknowledgement frame is 10 bits. • The link data rate in each direction is 1 Mbps ($= 10^6$ bits per second). • One way propagation delay of the link is 100 milliseconds. The minimum value of the sender's window size in terms of the number of frames, (rounded to the nearest integer) needed to achieve a link utilization of 50% is _____.

Q.7	Consider the three-way handshake mechanism followed during TCP connection establishment between hosts P and Q. Let X and Y be two random 32-bit starting sequence numbers chosen by P and Q respectively. Suppose P sends a TCP connection request message to Q with a TCP segment having SYN bit = 1, SEQ number = X, and ACK bit = 0. Suppose Q accepts the connection request. Which one of the following choices represents the information present in the TCP segment header that is sent by Q to P?
(A)	SYN bit = 1, SEQ number = X+1, ACK bit = 0, ACK number = Y, FIN bit = 0
(B)	SYN bit = 0, SEQ number = X+1, ACK bit = 0, ACK number = Y, FIN bit = 1
(C)	SYN bit = 1, SEQ number = Y, ACK bit = 1, ACK number = X+1, FIN bit = 0
(D)	SYN bit = 1, SEQ number = Y, ACK bit = 1, ACK number = X, FIN bit = 0

Q.54	Consider a network using the pure ALOHA medium access control protocol, where each frame is of length 1,000 bits. The channel transmission rate is 1 Mbps ($= 10^6$ bits per second). The aggregate number of transmissions across all the nodes (including new frame transmissions and retransmitted frames due to collisions) is modelled as a Poisson process with a rate of 1,000 frames per second. Throughput is defined as the average number of frames successfully transmitted per second. The throughput of the network (rounded to the nearest integer) is _____.

Q.45	Consider a computer network using the distance vector routing algorithm in its network layer. The partial topology of the network is as shown below.
	The objective is to find the shortest-cost path from the router R to routers P and Q. Assume that R does not initially know the shortest routes to P and Q. Assume that R has three neighbouring routers denoted as X, Y, and Z. During one iteration, R measures its distance to its neighbours X, Y, and Z as 3, 2, and 5, respectively. Router R gets routing vectors from its neighbours that indicate that the distance to router P from routers X, Y, and Z are 7, 6, and 5, respectively. The routing vector also indicates that the distance to router Q from routers X, Y, and Z are 4, 6, and 8, respectively. Which of the following statement(s) is/are correct with respect to the new routing table of R, after updation during this iteration?
(A)	The distance from R to P will be stored as 10.
(B)	The distance from R to Q will be stored as 7.
(C)	The next hop router for a packet from R to P is Y.
(D)	The next hop router for a packet from R to Q is Z.

2020

Assume that you have made a request for a web page through your web browser to a web server. Initially the browser cache is empty. Further, the browser is configured to send HTTP requests in non-persistent mode. The web page contains text and five very small images. The minimum number of TCP connections required to display the web page completely in your browser is _____.

Q.38

An organization requires a range of IP addresses to assign one to each of its 1500 computers. The organization has approached an Internet Service Provider (ISP) for this task. The ISP uses CIDR and serves the requests from the available IP address space 202.61.0.0/17. The ISP wants to assign an address space to the organization which will minimize the number of routing entries in the ISP's router using route aggregation. Which of the following address spaces are potential candidates from which the ISP can allot any one to the organization?

   I.   202.61.84.0/21
   II.   202.61.104.0/21
   III. 202.61.64.0/21
   IV.   202.61.144.0/21

(A) I and II only
(B) II and III only
(C) III and IV only
(D) I and IV only

Q.No. 55 Consider a TCP connection between a client and a server with the following specifications: the round trip time is 6 ms, the size of the receiver advertised window is 50 KB, slow-start threshold at the client is 32 KB, and the maximum segment size is 2 KB. The connection is established at time $t = 0$. Assume that there are no timeouts and errors during transmission. Then the size of the congestion window (in KB) at time $t + 60$ ms after all acknowledgements are processed is _____.

2019

Q.16 Which of the following protocol pairs can be used to send and retrieve e-mails (in that order)?

(A) IMAP, POP3 　　　　　・　　　　　(B) SMTP, POP3
(C) SMTP, MIME 　　　　　　　　　　(D) IMAP, SMTP

Q.28 Consider three machines M, N, and P with IP addresses 100.10.5.2, 100.10.5.5, and 100.10.5.6 respectively. The subnet mask is set to 255.255.255.252 for all the three machines. Which one of the following is true?

(A) M, N, and P all belong to the same subnet
(B) Only M and N belong to the same subnet
(C) Only N and P belong to the same subnet
(D) M, N, and P belong to three different subnets

Q.29 Suppose that in an IP-over-Ethernet network, a machine X wishes to find the MAC address of another machine Y in its subnet. Which one of the following techniques can be used for this?

(A) X sends an ARP request packet to the local gateway's IP address which then finds the MAC address of Y and sends to X
(B) X sends an ARP request packet to the local gateway's MAC address which then finds the MAC address of Y and sends to X
(C) X sends an ARP request packet with broadcast MAC address in its local subnet
(D) X sends an ARP request packet with broadcast IP address in its local subnet

Q.14 Consider the following statements regarding the slow start phase of the TCP congestion control algorithm. Note that *cwnd* stands for the TCP congestion window and MSS denotes the Maximum Segment Size.

    (i)   The *cwnd* increases by 2 MSS on every successful acknowledgment.
    (ii) The *cwnd* approximately doubles on every successful acknowledgement.
    (iii) The *cwnd* increases by 1 MSS every round trip time.
    (iv) The *cwnd* approximately doubles every round trip time.

Which one of the following is correct?

(A) Only (ii) and (iii) are true   (B) Only (i) and (iii) are true
(C) Only (iv) is true   (D) Only (i) and (iv) are true

Q.54 Consider an IP packet with a length of 4,500 bytes that includes a 20-byte IPv4 header and a 40-byte TCP header. The packet is forwarded to an IPv4 router that supports a Maximum Transmission Unit (MTU) of 600 bytes. Assume that the length of the IP header in all the outgoing fragments of this packet is 20 bytes. Assume that the fragmentation offset value stored in the first fragment is 0.

The fragmentation offset value stored in the third fragment is _____.

Q.55 Consider a simple communication system where multiple nodes are connected by a shared broadcast medium (like Ethernet or wireless). The nodes in the system use the following carrier-sense based medium access protocol. A node that receives a packet to transmit will carrier-sense the medium for 5 units of time. If the node does not detect any other transmission in this duration, it starts transmitting its packet in the next time unit. If the node detects another transmission, it waits until this other transmission finishes, and then begins to carrier-sense for 5 time units again. Once they start to transmit, nodes do not perform any collision detection and continue transmission even if a collision occurs. All transmissions last for 20 units of time. Assume that the transmission signal travels at the speed of 10 meters per unit time in the medium.

Assume that the system has two nodes P and Q, located at a distance d meters from each other. P starts transmitting a packet at time $t=0$ after successfully completing its carrier-sense phase. Node Q has a packet to transmit at time $t=0$ and begins to carrier-sense the medium.

The maximum distance d (in meters, rounded to the closest integer) that allows Q to successfully avoid a collision between its proposed transmission and P's ongoing transmission is _____.

2017

Consider the following statements about the routing protocols, Routing Information Protocol (RIP) and Open Shortest Path First (OSPF) in an IPv4 network.

   I: RIP uses distance vector routing
   II: RIP packets are sent using UDP
   III: OSPF packets are sent using TCP
   IV: OSPF operation is based on link-state routing

Which of the statements above are CORRECT?

   (A) I and IV only
   (B) I, II and III only
   (C) I, II and IV only
   (D) II, III and IV only

Q.18

Consider socket API on a Linux machine that supports connected UDP sockets. A connected UDP socket is a UDP socket on which **connect** function has already been called. Which of the following statements is/are CORRECT?

I.   A connected UDP socket can be used to communicate with multiple peers simultaneously.

II.   A process can successfully call **connect** function again for an already connected UDP socket.

(A) I only
(B) II only
(C) Both I and II
(D) Neither I nor II

The maximum number of IPv4 router addresses that can be listed in the record route (RR) option field of an IPv4 header is _____ .

Consider a TCP client and a TCP server running on two different machines. After completing data transfer, the TCP client calls `close` to terminate the connection and a FIN segment is sent to the TCP server. Server-side TCP responds by sending an ACK, which is received by the client-side TCP. As per the TCP connection state diagram (RFC 793), in which state does the client-side TCP connection wait for the FIN from the server-side TCP?

(A) LAST-ACK
(B) TIME-WAIT
(C) FIN-WAIT-1
(D) FIN-WAIT-2

A sender S sends a message m to receiver R, which is digitally signed by S with its private key. In this scenario, one or more of the following security violations can take place.

(I)   S can launch a birthday attack to replace m with a fraudulent message.
(II)   A third party attacker can launch a birthday attack to replace m with a fraudulent message.
(III) R can launch a birthday attack to replace m with a fraudulent message.

Which of the following are possible security violations?

(A)   (I) and (II) only

(B)   (I) only

(C)   (II) only

(D)   (II) and (III) only

Q.24 In an Ethernet local area network, which one of the following statements is **TRUE**?

    (A) A station stops to sense the channel once it starts transmitting a frame.

    (B) The purpose of the jamming signal is to pad the frames that are smaller than the minimum frame size.

    (C) A station continues to transmit the packet even after the collision is detected.

    (D) The exponential backoff mechanism reduces the probability of collision on retransmissions.

Q.25 Identify the correct sequence in which the following packets are transmitted on the network by a host when a browser requests a webpage from a remote server, assuming that the host has just been restarted.

    (A) HTTP GET request, DNS query, TCP SYN

    (B) DNS query, HTTP GET request, TCP SYN

    (C) DNS query, TCP SYN, HTTP GET request

    (D) TCP SYN, DNS query, HTTP GET request

Q.53 A network has a data transmission bandwidth of 20×10^6 bits per second. It uses CSMA/CD in the MAC layer. The maximum signal propagation time from one node to another node is 40 microseconds. The minimum size of a frame in the network is _____ bytes.

Q.54 For the IEEE 802.11 MAC protocol for wireless communication, which of the following statements is/are **TRUE**?

    I. At least three non-overlapping channels are available for transmissions.

    II. The RTS-CTS mechanism is used for collision detection.

    III. Unicast frames are ACKed.

    (A) All I, II, and III

    (B) I and III only

    (C) II and III only

    (D) II only

Q.55 Consider a 128×10^3 bits/second satellite communication link with one way propagation delay of 150 milliseconds. Selective retransmission (repeat) protocol is used on this link to send data with a frame size of 1 kilobyte. Neglect the transmission time of acknowledgement. The minimum number of bits required for the sequence number field to achieve 100% utilization is _____ .

2015

Q. 38

In the network 200.10.11.144/27, the fourth octet (in decimal) of the last IP address of the network which can be assigned to a host is _____ .

Q. 52

Host A sends a UDP datagram containing 8880 bytes of user data to host B over an Ethernet LAN. Ethernet frames may carry data up to 1500 bytes (i.e. MTU=1500 bytes). Size of UDP header is 8 bytes and size of IP header is 20 bytes. There is no option field in IP header. How many total number of IP fragments will be transmitted and what will be the contents of offset field in the last fragment?

(A) 6 and 925
(B) 6 and 7400
(C) 7 and 1110
(D) 7 and 8880

Q. 29

Consider a LAN with four nodes S_1, S_2, S_3 and S_4. Time is divided into fixed-size slots, and a node can begin its transmission only at the beginning of a slot. A collision is said to have occurred if more than one node transmit in the same slot. The probabilities of generation of a frame in a time slot by S_1, S_2, S_3 and S_4 are 0.1, 0.2, 0.3 and 0.4, respectively. The probability of sending a frame in the first slot without any collision by any of these four stations is _____.

Q. 53

Suppose that the stop-and-wait protocol is used on a link with a bit rate of 64 kilobits per second and 20 milliseconds propagation delay. Assume that the transmission time for the acknowledgement and the processing time at nodes are negligible. Then the minimum frame size in bytes to achieve a link utilization of at least 50% is _____.