### ISO/OSI Layers

1) Which of the following functionalities must be implemented by a transport protocol over and above the network protocol?

1 Marks GATE-CSE/IT-2003()

[A] Recovery from packet losses [B] Detection of duplicate packets

[C]Packet delivery in the correct order [D]End to end connectivity

2). Choose the best matching between Group 1 and Group 2.

Group – 1	Group -2
	<ol> <li>Ensures reliable transport of data over a physical point-to-point link</li> <li>Encodes/decodes data for physical transmission</li> <li>Allow end-to-end communication between two processes</li> <li>Routes data from one network node to the next</li> </ol>

1 Marks GATE-CSE/IT-2004( )

[A]P-1, Q-4, R-3

[B] P-2, Q-4, R-1

[C]P-2, Q-3, R-1

[D]P-1, Q-3, R-2

3) Which of the following is NOT true with respect to a transparent bridge and a router?

1 Marks GATE-CSE/IT-2004( )

[A] Both bridge and router selectively forward data packets

[B] Abridge uses IP addresses while a router uses MAC addresses

[C]A bridge builds up it routing table by inspecting incoming packets

[D]A router can connect between a LAN and a WAN

4) Which one of the following uses UDP as the transport protocol?

2 Marks GATE-CSE/IT-2007()

[A] Telnet [B] DNS [C]SMTP [D]HTTP

5) There are n stations in a slotted LAN. Each station attempts to transmit with a probability p in each time slot. What is the probability that ONLY one station transmits in a given time slot?

2 Marks GATE-CSE/IT-2007()

[A]  $np(1-p)^{n-1}$  [B]  $(1-p)^{n-1}$ 

$$[C]p(1-p)^{n-1}$$
  $[D]1-(1-p)^{n-1}$ 

6) While opening a TCP connection, the initial sequence number is to be derived using a time-of-day (ToD) clock that keeps running even when the host is down. The low order -32 bits of the counter of the ToD clock is to be used for the initial sequence numbers. The clock counter increments once per millisecond. The maximum packet lifetime is given to be 64s.

Which one of the choices given below is closest to the minimum permissible rate at which sequence numbers used for packets of a connection can increase?

2 Marks GATE-CSE/IT-2008()

[A] 0.015/s [B] 0.064/s [C] 0.135/s [D] 0.327/s

7) Let G(x) be the generator polynomial used for CRC checking. What is the condition that should be satisfied by G(x) to detect odd number of bits in error?

2 Marks GATE-CSE/IT-2009()

[A] G(x) contains more than two terms

[B] G(x) does not divide 1 + xk, for any k not

exceeding the frame length

[C] 1 + x is a factor of G(x)

[D]G(x) has an odd number of terms

8) Packets of the same session may be routed through different paths in

1 Marks GATE-CSE/IT-2005()

### ISO/OSI Layers

[B]TCP and UDP

[A] TCP, but not UDP

[C]UDP, but not TCP [D]Neither TCP, nor UDP

9) One of the header fields in an IP datagram is the Time to Live (TTL) field. Which of the following statements best explains the need for this field?

1 Marks GATE-CSE/IT-2010()

[A] It can be used to prioritize packets

[B] It can be used to reduce delays

[C]It can be used to optimize throughput

[D]It can be used to prevent packet looping

10) Suppose computers A and B have IP addresses 10.105.1.113 and 10.105.1.91 respectively and they both use the same net mask N. Which of the values of N given below should not be used if A and B should belong to the same network?

2 Marks GATE-CSE/IT-2010()

[A] 255.255.255.0 [C] 255.255.255.192 [B] 255.255.255.128 [D]255.255.255.224

11) In serial data transmission, every byte of data is padded with a '0' in the beginning and one or two '1's at the end of byte because

1 Marks GATE-CSE/IT-2002()

[A] Receiver is to be synchronized for byte reception

[B] Receiver recovers lost '0's and '1's from these

padded bits

[C]Padded bits are useful in parity computation

[D]None of the above

12) A CPU has two modes – privileged and non – privileged. In order to change the mode from privileged to non – privileged

1 Marks GATE-CSE/IT-2001()

[A] a hardware interrupt is needed

[B] a software interrupt is needed

[C]a privileged instruction (which does not generate an interrupt) is needed

[D]a non-privileged instruction (which does not generate an interrupt is needed

# ISO/OSI Layers

Key Paper

1. D 2. Α В 5. 3. В 4. Α D В 7. С 8. В 9. D 10. 6. 11. Α 12. В

### **Network Topologies**

#### Common Data for Q1 and Q2 is given below

Consider three IP networks A, B and C. Host  $H_a$  in network A sends messages each containing 180 bytes of application data to a host  $H_{c-}$  in network C. The TCP layer prefixes a 20 byte header to the message. This passes through an intermediate network B. The maximum packet size, including 20 bye IP header, In each network is

A : 1000 bytes B : 100 bytes C : 1000 bytes

The network A and B are connected through a 1 Mbps link, while B and C are connected by a 512 Kbps link (bps = bits per second).

Network A 1Mbps Network B 512kbps Network C

1) Assuming that the packets are correctly delivered, how many bytes, including headers, are delivered to the IPlayer at the destination for one application message, in the best case? Consider only data packets.

1 Marks GATE-CSE/IT-2004()

[A] 200 [B] 220 [C] 240 [D] 260

2) What is the rate at which application data is transferred to host HC? Ignore errors, acknowledgements, and other overheads.

1 Marks GATE-CSE/IT-2004()

[A] 325.5Kbps [B] 354.5 Kbps [D] 512.0 Kbps

3) Two computers C1 and C2 are configured as follows. C1 has IP address 203. 197.2.53 and netmask 255.255.128.0 C2 has IP address 203.197.75.201 and netmask 255.255.192.0. Which one of the following statements is true?

2 Marks GATE-CSE/IT-2006()

[A] C1 and C2 both assume they are on the same network

[B] C2 assumes C1 is on same network, but C1 assumes C2 is on a different network

[C]C1 assumes C2 is on same network, but C2 assumes C1 is on a different network

[D]C1 and C2 both assume they are on different

networks

4) In a token ring network the transmission speed is 10 bps and the propagation speed is 200 meters /  $\mu$ s. The 1-bit delay in this network is equivalent to:

2 Marks GATE-CSE/IT-2007()

[A] 500 meters of cable [B] 200 meters of cable [D]50 meters of cable.

5) A computer on a 10Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 2Mbps. It is initially filled to capacity with 16 Megabits. What is the maximum duration for which the computer can transmit at the full 10Mbps?

1 Marks GATE-CSE/IT-2008()

[A] 1.6 seconds

[B] 2 seconds

[C]5 seconds [D]8 seconds

# Network Topologies

Key Paper

1. D 2. B 3. C 4. C 5. B

#### **Network Protocols**

1) Which of the following assertions is FALSE about the Internet Protocol (IP)?

1 Marks GATE-CSE/IT-2003()

[A] It is possible for a computer to have multiple IP addresses

[C]IP ensures that a packet is forwarded if it is unable to reach its destination within a given number of hopes.

- [B] IP packets from the same source to the same destination can take different routes in the network.
- [D]The packet source cannot set the route of an outgoing packets; the route is determined only by the routing tables in the routers on the way.
- 2) The subnet mask for aparticular network is 225.255.31.0. Which of the following pairs of IPaddresses could belong to this network?

2 Marks GATE-CSE/IT-2003()

[A] 172.57.88.62 and 172.56.87.23.2

[B] 10.3528.2 and 10.35.29.4

[C]191.203.31.87 and 191.234.31.88

[D]128.8 129.43 and 128.8.161.55

3) A 2 km long broadcast LAN has 107 bps bandwidth and uses CSMA/ CD. The signal travels along the wire at  $2 \times 108$ m/s. What is the minimum packet size that can be used on this network?

2 Marks GATE-CSE/IT-2003()

[A] 50 bytes

[B] 100bytes

[C]200bytes

[D]None of the above

4) A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both, A and B attempt to transmit a frame, collide, and a winds the first back off race. At the end of this successful transmission by A, both, A and B attempt to transmit and collide. The probability that A winds the second back off race is

1 Marks GATE-CSE/IT-2004(

[A] 0.5 [B] 0.625 [C] 0.75 [D] 1.0

5) The routing table of a routeris shown below:

Destination	Subnet Mask	Interface
128.75.43.0	255.255.255.0	Eth0
128.75.43.0	255.255.255.128	Eth1
192.12.17.5	255.255.255.255	Eth3
deraulf		Eth2

On which interfaces will therouter forward packets addressed to destinations 128.75.43.16 and 192.12.17.10respectively?

1 Marks GATE-CSE/IT-2004( )

[A] Eth1 and Eth2

[B] Eth0 and Eth2

[C]Eth0 and Eth3

[D]Eth1 and Eth3

6) Suppose the round trippropagation delay for a 10 Mbps Ethernet having 48-bit jamming signal is 46.4 µs. Theminimum frame size is:

2 Marks GATE-CSE/IT-2005()

[A] 94 [B] 416 [C] 464 [D] 512

7) For which one of the following reasons does Internet Protocol (IP) use the time-to-live (TTL) field in the IP diagram header?

2 Marks GATE-CSE/IT-2005()

[A] Ensure packets reach destination within that time

[B] Discard packets that reach later than that time

[C]Prevent packets from looping indefinitely

[D]Limit the time for which a packet gets queued in intermediate routers

8) The address of a class B hostis to be split into subnets with a 6-bit subnet number. What is the maximum number of subnets and themaximum number of hosts in each subnet?

### **Network Protocols**

2 Marks GATE-CSE/IT-2007()

[A] 62 subnets and 262142 hosts
[C] 62 subnets and 1022 hosts
[D] 64 subnets and 1024 hosts

9) What is the maximum size of data that the application layer can pass on to the TCP layer below

[A] Any size [B] 2 bytes – size of TCP header

[C]2<sup>16</sup> bytes [D]1500 bytes

10) If a class B network on the Internet has a subnet mask of 255.255.248.0, what is the maximum number of hosts per subnet?

1 Marks GATE-CSE/IT-2008()

[A] 1022 [B] 1023 [C] 2046 [D] 2047

11) A client process P needs tomake a TCP connection to a server process S. Consider the following situation: the server process S executes a socket(), a bind() and a listen() system call in that order, following which it is preempted. Subsequently, the client process P executes asocket() system call followed by connect() system call to connect to theserver process S. The server process has not executed any accept() systemcall. Which one of the following events could take place?

1 Marks GATE-CSE/IT-2008()

[A] Connect() system call returns successfully [B] Connect () system call blocks

[C]Connect() system call returns an error. [D]Connect() system call results in a core dump

# Network Protocols

Key Paper

D 1. D 2. 3. С В 5. 4. Α 7. 8. 9. С D В С В 10. 6.

11. C

### **Routing Algorithms**

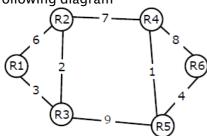
1) Station A uses 32 bytepackets to transmit messages to Station B using a sliding window protocol. Theround trip delay between A and B is 80 milliseconds and the bottleneckbandwidth on the path between A and B is 128 kbps. Hat is the optimal window size that a shoulduse?

2 Marks GATE-CSE/IT-2006()

[A]20 [B]40 [D]320

Statement for Linked answer Q2 and Q3 is given below

2) Consider a network with 6 routers R1 to R6 connected with links having weights as shown in the following diagram



Q.

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, how many links in the network will never be used for carrying any data?

2 Marks GATE-CSE/IT-2010,GATE-CSE/IT-2010()

[A]4 [B]3 [C]2 [D]1

3) Suppose the weights of all unused links in the previous question are changed to 2 and the distance vector algorithm is used again until all routing tables stabilize. How many links will now remain unused?

2 Marks GATE-CSE/IT-2010()

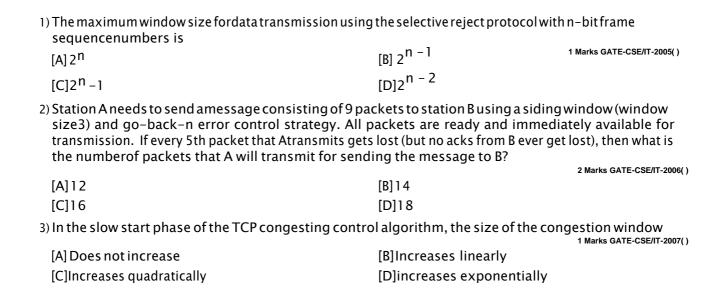
[A] 0 [B] 1 [C] 2 [D] 3

# Routing Algorithms

Key Paper

1. B 2. C 3. D

### Congestion control



## Congestion control

Key Paper

1. B 2. C 3. D

### cryptography, digital signature

1) The message 11001001 is to be transmitted using the CRC polynomial  $x^3 + 1$  to protect it from errors. The message that should be transmitted is:

2 Marks GATE-CSE/IT-2007()

[A]11001001000

[B] 11001001011

[C]11001010

[D]110010010011

## cryptography, digital signature

Key Paper

1. B