Branch : CSE & IT Batch : Hinglish

WEEKLY TEST – 08

Subject : Computer Networks

Topic : TCP & UDP

Maximum Marks 19

Q.1 to 7 Carry ONE Mark Each

[MSQ]

1. Which of the following are the services provided by the transport layer?

(a) Reliable delivery
(b) Multiplexing
(c) End – to – End delivery
(d) Flow control

[MCQ]

2. Match List-I with the List-II:

List-I		List-II	
(A)	CLOSED	(I)	The application has said it is finished
(B)	LISTEN	(II)	The other side has agreed to release
(C)	FIN WAIT 1	(III)	The server is waiting for an incoming call.
(D)	FIN WAIT 2	(IV)	No connection is active or pending

Choose the correct answer from the options given below:

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

[MSQ]

3. If a WAN Link is 2 Mbps and RTT between source and destination is 200 msec. then what will be the optimal TCP window size needed to fully utilize the line?

(a) 200000 bits (b) 25000 bits
(c) 20000 bytes (d) 25000 bytes

[MSQ]

4. Silly window syndrome is a problem that arises due to the poor implementation of TCP. Which of the following are the cause of silly window syndrome?

(a) Receiver transmitting data in small segments repeatedly.
(b) Sender transmitting data in small segment repeatedly.
(c) Receiver accepting only few bytes at a time repeatedly.
(d) Sender accepting only few bytes at a time repeatedly.

[MCQ]

5. Among the following TCP timer which of the following timer deal with a zero-window-size deadlock situation?

(a) Keep Alive Timer
(b) Time Wait Timer
(c) Time Out Timer
(d) Persistent Timer

[NAT]

6. Consider a network, in which the data transmission rate is 10 Mbps. It uses CSMA/CD in the MAC layer. The maximum signal propagation time from one node to another node is 50 microseconds. What is the minimum size of a frame in the network in bits?

[MCQ]

7. Which of the following option(s) is/are true?

(a) Pure aloha has maximum throughput 18.4%
(b) Slotted aloha has maximum throughput 36.8%
(c) In pure aloha, the probability of successful transmission of the data packet is $G \times e^{-2G}$.
(d) In slotted aloha the probability of successful transmission of the data packet is $G \times e^{-G}$.

Q.8 to 13 Carry TWO Mark Each

[NAT]

8. Consider the following statements:

S_1: When ACK field is set, then it validates the acknowledgement number.

S_2: The PSH field is used to inform the sender that higher throughout is needed so if possible, data must be pushed with higher throughput.

S_3. The reset bit is used to reset the TCP connection when there is any confusion occurs in the sequence number.

How many statements is/are true with respect to the flags in in TCP header?

[MSQ]

9. TCP uses several timers to ensure that excessive delays are not encountered during communication. Consider the following option and select the correct option among the following.

(a) TCP uses a time out timer for retransmission of lost segment

(b) TCP uses a time out timer during connection termination.

(c) TCP uses a time wait timer during connection termination.

(d) TCP user a time wait timer for retransmission of lost segment.

[NAT]

10. Suppose host A is sending a large file to host B over TCP connection. The round trip time (RTT) is 10 msec. The hosts are connected by 1 Gbps link.

Assuming that they are using the packet size 1000 bytes to transmit the file (ignore ACK packets). At least how big would the window size (in packets) have to be for the channel utilization to be greater than 80% ?

[NAT]

11. A TCP machine is sending windows of 65535B over 2 Gbps channel that has 40 msec. RTT. What is the maximum achievable throughput? (upto one decimal place Mbps.)

[MCQ]

12. The TCP sliding window

(a) Can be used to control the flow of information

(b) Always occurs when the field value is 0

(c) Always occurs when the field value is 1.

(d) Occurs horizontally.

[NAT]

13. Consider a LAN with five nodes. Time is divided into fixed-size slots. A node can begin its transmission only at the beginning of a slot. A collision occur if more than two nodes transmits in the same slot. The probabilities of generation of a frame in a time slot by these LAN are 0.2, 0.3, 0.25, 0.16 and 0.09 respectively. The probability of transmission in the first slot without any collision by any of these five station is_____.

Answer Key

1. **(a,b,c,d)**
2. **(c)**
3. **(a, d)**
4. **(b, c)**
5. **(d)**
6. **(1000 to 1000)**
7. **(a,b,c,d)**
8. **(3 to 3)**
9. **(a,c)**
10. **(Range 1000 to 1000)**
11. **(Range 13.1 to 13.3)**
12. **(a)**
13. **(0.41 to 0.41)**

Hints and Solutions

1. (a,b,c,d)

Transport larger services:

1. End - to - End delivery
2. Addressing
3. Reliable delivery
4. Flow control
5. Multiplexing

2. (c)

The correct matching is as following:

$A \rightarrow IV$

$B \rightarrow III$

$C \rightarrow I$

$D \rightarrow II$

3. (a, d)

Given,

Bandwidth = 2Mpbs

RTT = 200 msec.

Optional window size = max data which is sent in 1 RTT

$= 1 \text{ Mbps} \times 200 \text{ msec.}$

$= 1 \times 10^6 \text{ bits/sec.} \times 200 \times 10^{-3} \text{ sec.}$

$= 200 \times 10^3 \text{ bits}$

$= 25000 \text{ bytes.}$

4. (b, c)

Causes of silly window syndrome.

(1) Sender transmitting data in small segment respectively.

(2) Receiver accepting only few bytes at a time repeatedly.

5. (d)

To deal with zero-window-size deadlock situation, TCP uses a persistent timer when the sending TCP receives an acknowledgement with a window size of zero, it starts a persistent timer.

6. (1000 to 1000)

For CSMA /CD

$T_t = \geq 2\, t_p$ .....(i)

T_t = transmission time

T_p = propagation time

$T_p = 50\ \mu\text{sec.} = 50 \times 10^{-6} \text{ sec.}$

Bandwidth = 10 Mbps = 10×10^6 bits/sec.

$$t_t = \frac{L(\text{Size of frame})}{\text{Bandwidth}}$$

From equation number (i)

$L \geq 2 \times \text{Bandwidth} \times t_p$

$\geq 2 \times 10 \times 10^6 \times 50 \times 10^{-6}$

$\boxed{L \geq 1000 \text{ bits}}$

7. (a,b,c,d)

All the given statements about pure and slotted are true.

8. (3 to 3)

All the given statements are true.

9. (a, c)

In TCP time out timer is used for retransmission of lost packet and time wait timer during connection termination.

10. (1000 to 1000)

Window size for 80% efficiency

Window size = 0.8× window size for 100% efficiency

= 0.8 × (max number of bits that can be transmitted in 1 RTT)

$= 0.8 \times 1 \text{ Gpbs} \times 10 \text{ msec.}$

$= 0.8 \times 10^9 \text{ bits /sec.} \times 10 \times 10^{-3} \text{ msec.}$

$= 8 \times 10^6 \text{ bits}$

$= 10^6 \text{ bytes}$

In terms of packets

$$\text{Window size} = \frac{10^6 \text{ bytes}}{\text{Packet size}} = \frac{10^6 \text{ bytes}}{10^3 \text{ bytes}} = 1000$$

11. (13.1 to 13.3)

Maximum achievable throughput

1 RTT	–	65535 B
40 msec.	–	65535 B
1 sec.	–	$\frac{65535 \text{ B}}{40 \times 10^{-3}}$
1 sec.	–	1638.375×10^3 bytes
1 sec.	–	13107×10^3 bits

$\boxed{\text{throughput} = 13.107 \text{ Mbps}}$

12. (a)

TCP uses the sliding window mechanism for the flow control of data in transit on a network.

13. (0.41 to 0.41)

Let

$P_1 = 0.2$

$P_2 = 0.3$

$P_3 = 0.25$

$P_4 = 0.16$

$P_5 = 0.09$

Probability = $P_1(1 - P_2)(1 - P_3)(1 - P_4)(1 - P_5)$
$+ (1 - P_1) P_2(1 - P_3)(1 - P_4)(1 - P_5)$
$+ (1 - P_1)(1 - P_2) P_3(1 - P_4)(1 - P_5)$
$+(1 - P_1)(1 - P_2)(1 - P_3) P_4(1 - P_5)$
$+ (1 - P_1)(1 - P_2)(1 - P_3)(1 - P_4) P_5$
$= 0.080262 + 0.137592 + 0.107016 + 0.061152 + 0.031752$
$= 0.4177$