KING SAUD UNIVERSITY COLLEGE OF COMPUTER AND INFORMATION SCIENCES COMPUTER SCIENCE DEPARTMENT		
CSC 329: Computer Network	**Tutorial 7**	**2nd Semester 1441**
Name:	**Student ID:**	

Part1: Multiple-Choice Questions

1. In the 1-persistent approach, when a station finds an idle line, it ________
   - a. Waits 0.1 s before sending
   - b. Waits 1 s before sending
   - c. Waits a time equal to 1—p before sending
   - d. Sends immediately

2. In the p-persistent approach, when a station finds an idle line, it _______
   - a. Waits 1 s before sending
   - b. Sends with probability I —p
   - c. Sends with probability p
   - d. Sends immediately

3. The 1-persistent approach can be considered a special case of the p-persistent approach with p equal to _______
   - a. 0.1
   - b. 0.5
   - c. 1.0
   - d. 2.0

4. __________ is a random-access protocol.
   - a. CSMA
   - b. Polling
   - c. FDMA
   - d. CDMA

5. When a primary device asks a secondary device if it has data to send, this is called
   - a. Polling
   - b. Selecting
   - c. Reserving
   - d. Backing off

6. If an FDMA network has eight stations, the medium bandwidth has _____ bands.
   - a. 1
   - b. 2
   - c. 8
   - d. 16

7. If a TDMA network has eight stations, the medium bandwidth has __________bands.

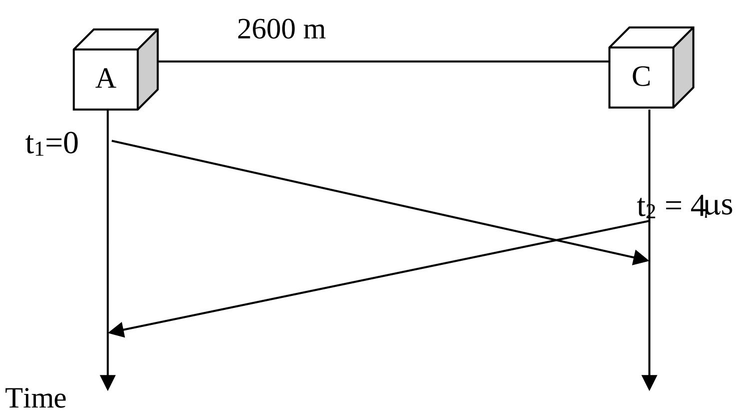
a.1
b.2
c. 8
d. 16

8. If a CDMA network has eight stations, the medium bandwidth has ________ bands.

a. 1
b.2
c. 8
d. 16

Part2: Exercises

1) The distance between two stations A and C is 2600 m, the data rate is 10 Mbps and the propagation speed is $2x10^8$ m/s. Station A starts sending a long frame at time $t_1 = 0$; station C starts sending a long frame at time $t_2 = 4$ μs. Find



When a station sends a frame it still takes time for the first bit to reach each station

a) **The time when station C hears the collision**
we need to compute the time needed for the first bit to reach station c
Propagation time= distance/speed
$=2600/2*10^8 = 13$ μs
C will hear the collision $t_3 = t_1 + T_P = 13$ μs

b) **The time when station A hears the collision**
Propagation time= 13 μs
A will hear the collision $t_4 = t_2 + T_P = 17$ μs

c) **The number of bits station A has sent before detecting the collision**
Number of bits = $t_4 - t_1$ * data rate = $17 * 10^{-6} * 10 * 10^6 = 170$ bit

d) **The number of bits station C has sent before detecting the collision**
Number of bits = $t_3 - t_2$ * data rate = $9 * 10^{-6} * 10 * 10^6 = 90$ bit

2) Four stations A,B,C and D share a link during 1-bit interval using CDMA channelization method. Assume that station B send a ***0*** bit ,stations A is ***silen***t and both of station C and D send a ***1*** bit. Each station is assigned a chip sequence as follow:

A = [-1 -1 -1 -1]
B = [-1 +1 -1 +1]
C = [-1 -1 +1 +1]
D = [-1 +1 +1 -1]

a) Determine the common data on the common channel.

Encoding:

A is silent → 0
B send 0 bit →-1
C send 1 bit → 1
D send 1 bit → 1

In the multiplexer:

0* [-1 -1 -1 -1] +-1 * [-1 +1 -1 +1] + 1 * [-1 -1 +1 +1] +1*[-1 +1 +1 -1]

The encoded number is multiplied by <u>each chip</u> in the sequence=
[0 0 0 0] + [+1 -1 +1 -1] + [-1 -1 +1 +1] + [-1 +1 +1 -1]

All first chips are added, as are all second, third and forth= [-1 -1 +3 -1] the result is a new sequence, which is transmitted through the link.

b) Show how does a receiver can detect the data sent by stations A,B,C, and D

- Station A: [-1 -1 +3 -1] * [-1 -1 -1 -1] = [+1 +1 -3 +1]
  Then the chips in the sequence are added and divided by 4: 1+1-3+1=0/4 =0→ silence
- Station B: [-1 -1 +3 -1] * [-1 +1 -1 +1] =[+1 -1 -3 -1] =-4/4= -1 → bit 0
- Station C: [-1 -1 +3 -1] * [-1 -1 +1 +1] = [+1 +1+3 -1] =4/4=1→bit 1
- Station D: [-1 -1 +3 -1] * [-1 +1 +1 -1] = [+1 -1 +3 +1] = 4/4 =1→bit 1