KING SAUD UNIVERSITY COLLEGE OF COMPUTER AND INFORMATION SCIENCES COMPUTER SCIENCE DEPARTMENT		
CSC 329: Computer Network	**Tutorial 2**	**1st Semester 1437-1438**
Name:	**Student ID:**	
Serial Number:	**Section Number:**	

Part1: Multiple-Choice Questions (Model Answer)

1) **Which of the following can be determined from a frequency-domain graph of a signal?**
   a. Bandwidth
   b. Phase
   c. Power
   d. All the above

2) **In a time-domain plot, the vertical axis measures the _____**
   a. Amplitude
   b. Frequency
   c. Phase
   d. Slope

3) **A periodic signal can always be decomposed into _____**
   a. Exactly an odd number of sine waves
   b. A set of sine waves.
   c. A set of sine waves, one of which must have a phase of 0º
   d. None of the above

4) **A sine wave is _____**
   a. Periodic and continuous
   b. Aperiodic and continuous
   c. Periodic and discrete
   d. Aperiodic and discrete

5) **If the maximum amplitude of a sine wave is 2 V, the minimum amplitude is___ V.**
   a. 2
   b. 1
   c. -2
   d. Between -2 and 2

6) **Given two sine waves A and B, if the frequency of A is twice that of B, then the period of B is _____ that of A.**

   a. One-half

b. Twice
c. The same as
d. Indeterminate from

7) As frequency increases, the period
a. Decreases
b. Increases
c. Remains the same
d. Doubles

8) A periodic signal completes one cycle in 0.001 s. What is the frequency?
a. 1Hz
b. 100Hz
c. 1KHz
d. 1MHz

9) If the bandwidth of a signal is 5 KHz and the lowest frequency is 52 KHz, what is the highest frequency?
a. 5KHz
b. 10KHz
c. 47KHz
d. 57KHz

10) What is the bandwidth of a signal that ranges from 40 KHz to 4 MHz?
a. 36 MHz
b. 360 KHz
c. 3.96 MHz
d. 396 KHz

11) Twisted-Pair and coaxial cable are used
a. copper
b. light
c. unwired
d. wireless

12) Cable that accepts and transports signals in form of light is
a. Unwired
b. fiber optic cable
c. coaxial cable
d. twisted pair cable

13) A repeater takes a weakened or corrupted signal and _____it.
a. Amplifies
b. Regenerates
c. Re-samples
d. Reroutes

Part2: Exercises

1) What is the phase shift for the following?

a. A sine wave starts at time Zero with minimum amplitude. The amplitude is increasing.
The phase shift = 270

b. A sine wave with minimum amplitude after 3/4 cycle. The phase shift = 0

c. A sine wave with zero amplitude after 1/2 cycle and increasing. The phase shift = 180

2) What is the bit rate for each of the following signals?

a. A signal in which 1 bit lasts 2 ms. $1/2*10^{-3}$ = 500 bps

b. A signal in which 10 bits last 20 µs. $10/20 * 10^{-6}$ =500000 bps =0.5 Mbps

3) A device is sending out data at the rate of 500 bps.

Bit interval (how long it takes a bit to travel)=1/ bit rate =1/500 =0.002 s

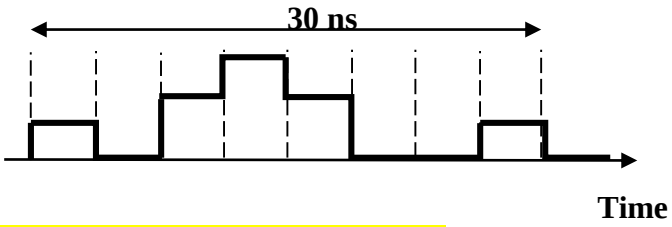
a. How long does it take to send out a single character (8 bits)?

Time to send 8 bits = 8 * bit interval = 8 * 0.002 =0.016 s

b. How long does it take to send a file of 100,000 characters?

Time to send 800,000 bits = 800,000 * bit interval = 800,000 * 0.002 =1600 s

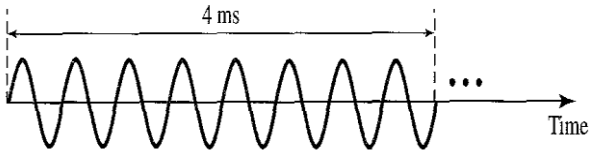
4) What is the bit rate for the signal in the following figure?



Number of bits per level =log2 L = log2 4 = log2 4 = 2

Bit rate = 2* 8 /(30* 10-9) = 0.533 Gbps

5) What is the frequency of the signal in the following figure?



8 cycles in 4ms

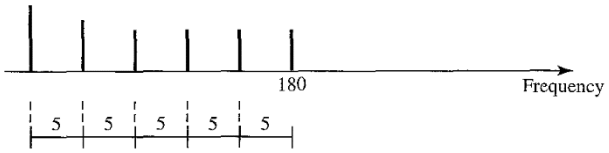
? cycles in 1 s

1*8 / 4*10-3 = 2000Hz

2 1ms

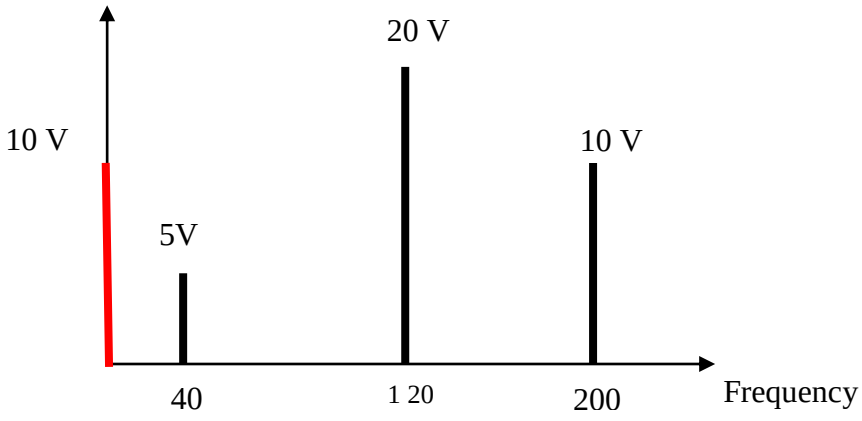
1s

6) What is the bandwidth and the lowest frequency of the composite signal shown in the figure?

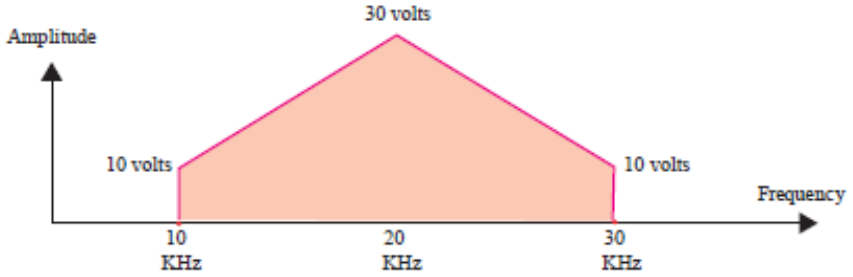


bandwidth = 5 * 5 = 25 Hz
bandwidth = f_h - f_l
f_l = **bandwidth** - f_h =180-25 =155 Hz

7) A periodic composite signal with a bandwidth of **200 Hz** is composed of constant signal of **10 V** and three sine waves: The first one has a frequency of **40 Hz** with a maximum amplitude of **5**V; the second one has a frequency of **120 Hz** with a maximum amplitude of **20** V and the third one has a maximum amplitude **of 10 V**. Draw the frequency spectrum of the signal.



8) A non-periodic composite signal contains frequencies from **10 to 30 KHz**. The amplitude is **10 V** for the extreme (min and max) frequencies and **30 V** for middle frequency. Assuming that the amplitudes change gradually from the minimum to the maximum. Draw the frequency spectrum of the signal.


30 volts
Amplitude
10 volts
10 volts
Frequency
10
KHz
20
KHz
30
KHz