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

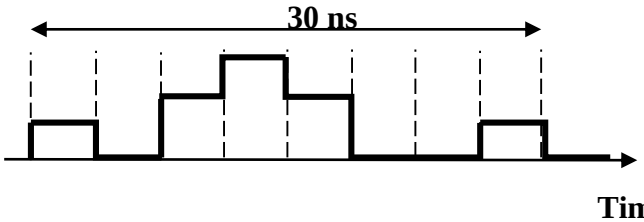
10) **What is the bandwidth of a signal that ranges from 40 KHz to 4 MHz?**
a. 36 MHz
b. 360 KHz
c. 3.96 MHz
d. 396 KHz

Part2: Exercises

1) 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

2) 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

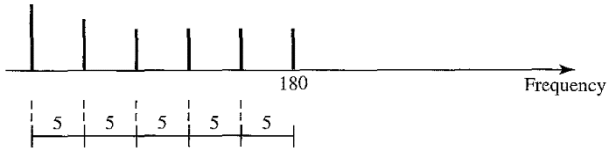
3) What is the bit rate for the signal in the following figure?



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

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

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



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

5) 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.