COURSE CODE / NAME : CPE413 / Wireless Networks
INDIVIDUAL ASSIGNMENT: Submit your answers in one file (pdf or word) via **Turnitin**
Class ID: 32352873 / Enrollment key: CPE413

DUE DATE : Friday, November 12, 2021

Instructions:

- Answer ALL the following questions.
- Please make sure that you hand in your **own answer** (Your answer should not be the same as your friends' answer / copy from any online site).
  Appropriate penalty will be given if found guilty of copying/plagiarism.
- Filename should follow this format (**StudentID-YourName- CPE413-Assignment1**)

QUESTION .1

If a signal has a fundamental frequency of 60 GHZ, calculate the followings:

- The signal Period (T).
- The wavelength (λ).

QUESTION .2

Study the works of Shannon and Nyquist on channel capacity. Each places an upper limit on the bit rate of a channel based on two different approaches. How are the two related?

QUESTION .3

What is the channel capacity for a teleprinter channel with a 450-Hz bandwidth and a signal-to-noise ratio of 5 dB?

QUESTION .4

A digital signaling system is required to operate at 9600 bps.

a) If a signal element encodes a 4-bit word, what is the minimum required bandwidth for the channel?

b) Repeat a) for the case of 8-bit words.

QUESTION .5

Given a channel with an intended capacity of 20 Mbps, the spectrum of the channel is between 6 MHz and 3 MHz. What signal-to-noise ratio is required to achieve this capacity?

QUESTION .6

What are the differences among ASK, BPSK, and BFSK?

QUESTION .7

Given a bit rate of 10 Mbps and a carrier frequency of 20 MHz, draw an ASK signal for the bit sequence 101001.

QUESTION .8

Given a bit rate of 10 Mbps and a carrier frequency of 10 MHz or 20 MHz to represent a binary 0 or 1, draw an FSK signal for the bit sequence 101001.

QUESTION .9

Given a bit rate of 10 Mbps and a carrier frequency of 10 MHz, draw a QPSK signal for the bit sequence 101101 using the constellation diagram (you may refer to Figure 7.6 in the book titled “Wireless communication networks and systems”).

QUESTION .10

A wireless transmission scheme employs 16 QAM (there are 16 different symbols) and a symbol is sent every millisecond.

a) What is the symbol rate of the system?
b) What is the data rate of the system in kbps?

Thank you