FIT1005
Networks and Data Communications
Tutorial – Week 4

Objective of this tutorial:

This tutorial has two objectives: one is to familiarise with some of the terms defined and equations used in week-two lecture, and the other is to strengthen the conceptual understanding of the material covered by reflecting on some selected questions, in small groups. The tutor will provide feedback to enhance your understanding and diminish misunderstandings, if any.

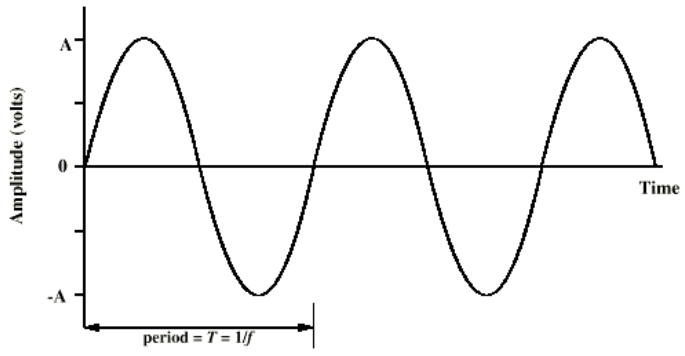
How to participate in the tutorial:

Form groups of four students in each and discuss the answers for the following revision and reflective questions with the group members. After spending about fifteen minutes for each question, discussing with group members, discuss your solutions with the tutor and other groups. The tutor will provide feedback on your solutions.

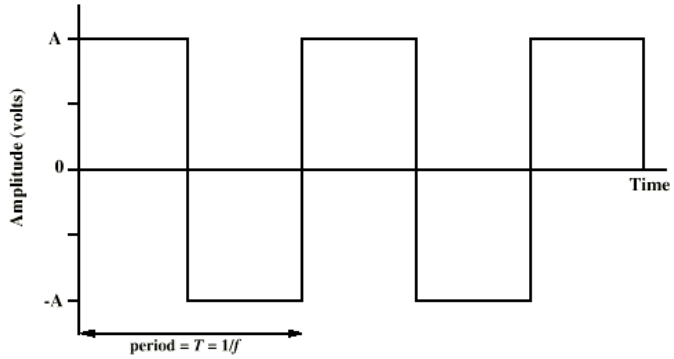
Revision questions:

1.

a. Differentiate between following 2 wave forms with respect to periodic/aperiodic nature, amplitude, frequency, period, phase, and discrete/continuous nature



(a) Sine wave



(b) Square wave

b. What does the term “wavelength” mean? How is it related to the period of a signal?

2.

a. It can be shown, using a discipline known as Fourier analysis, that any signal is made up of components at various frequencies, in which each component is a sinusoid. What does the term “fundamental frequency” mean with regard to this?

b. What do the terms “spectrum and absolute bandwidth” of a signal mean? Identify them with respect to the following waveform.

$$S(t) = 4/\Pi\ [\sin(2\ \Pi\ ft) + (1/3)\sin(2\ \Pi\ (3f)t) + (1/5)\sin(2\ \Pi\ (5f)t)]$$

3. What is the thermal noise power density in W/Hz in a room of temperature 27^0C.? Also calculate the same thermal noise in decibel-watts.