BCIT

COMP 3721 **Assignment 1**

Note:

- Submit a single PDF file.
- Answer the questions according to textbook, lecture notes and class discussions, not ChatGPT or Google.

Q1 (20 marks):

(a) What is the amplitude, frequency, and period of the following signals?

(b) Draw each of the signals on a time-domain plot and a frequency-domain plot.

(i) $s(t) = -3\sin(12t)$

(ii) $s(t) = 4\sin(3\pi t)$

Q2 (5 marks):

A signal has a wavelength of 1 μm in air. How far can the front of the wave travel during 1000 periods?

Q3 (10 marks):

A computer monitor displays an image with a resolution of 1200×1000 pixels. Each pixel can represent 1024 different colors.

(a) How many bits are required to transmit the entire contents of the screen?

(b) Given a transmission rate of 1 Mbps (megabits per second), how long would it take to download 14 images?

Q4 (5 marks):

How can a composite signal be decomposed into its individual frequencies? Explain.

Q5 (5 marks):

Can we say whether a signal is periodic or nonperiodic by just looking at its frequency domain plot? How?

Q6 (5 marks):

A periodic composite signal contains frequencies from 10 to 30 kHz, each with an amplitude of 10 V. Draw the frequency spectrum.

— End of Assignment 1 —