UWA – ENSC3015 Signals and Systems

12:00pm, Monday, August 23, 2021	
Mock Class Test: Introduction and Systems Analysis	
Time allowed: 20 minutes Max mark: 12, Assessment: **N/A**	This paper contains: 1 page, 3 questions

IMPORTANT INSTRUCTIONS:

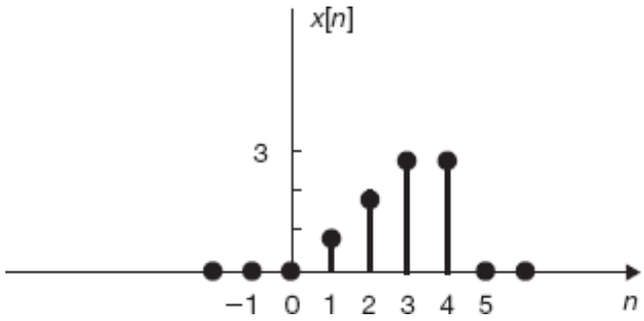
Candidates should attempt **all** questions and show **all** working with numerical answers to **3** decimal places in the spaces provided after each question, show as **much working as possible to gain maximum marks**.

Properly space solutions to ensure high quality image scans, **use black/blue pen or 2B pencil on white ruled/plain paper** to ensure sufficient contrast, and ensure **you are in a well-lit area**. You will also need a **scientific calculator** and scratch pad to for draft working.

Solutions will be marked page by page, so **start questions on new page**

Question 1 (4 marks)

A discrete-time signal $x[n]$ is shown below:



Sketch and label the following signal: $x[2n]$

Question 2 (5 marks)

Consider the following system where $x(t)$ is the input (where $x(t) > 0$, for all t) and $y(t)$ is the output:

$$y(t) = \log\big(x(t+1)\big)$$

Determine whether the system is:

a) memoryless? (yes or no)
b) time-invariant? (yes or no)
c) linear? (yes or no)
d) causal? (yes or no)
e) BIBO stable? (yes or no)

Question 3 (3 marks)

Find the zero-input response for the system described by:

$$3\frac{d}{dt}y(t) + 1 = 4x(t)$$

given initial conditions $y_0(0) = 3$.