

SULIT

UNIVERSITI MALAYSIA PERLIS

Peperiksaan Semester I
Sesi Akademik 2020/2021

**DKT 215 – Signals and Systems Principles
[Prinsip Isyarat dan Sistem]**

Masa: 1 Jam 30 Minit

Please make sure that this examination paper has **FOUR (4)** printed pages including this front page and appendix before you start the examination

Answer **ALL** questions. (40 marks)

SULIT

QUESTION 1

- (a) Deterministic and random is a type of five classifications of signals. Discuss. (4 Marks)
- (b) A continuous-time signal $x(t)$ is shown in **Figure 1**. Sketch and label each of the following signals.

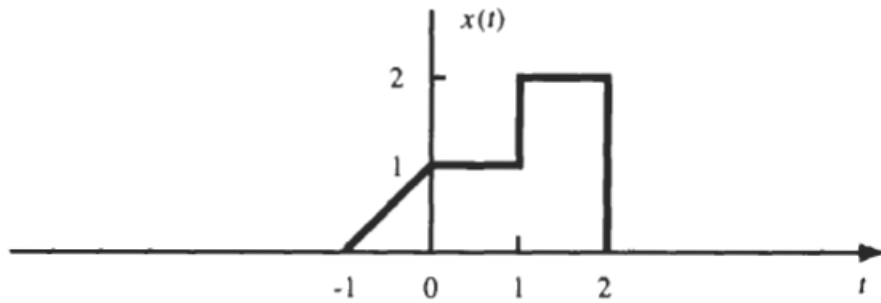


Figure 1

- i. $x\left(\frac{t}{4} - 2\right)$ (2 Marks)
- ii. $x(-t + 2)$ (2 Marks)
- iii. $x(-2t)$ (2 Marks)
- iv. $x\left(\frac{t}{2}\right)$ (2 Marks)

c) A discrete-time signal $x_e[n]$ is **Figure 2**, sketch and label each of the following signal.

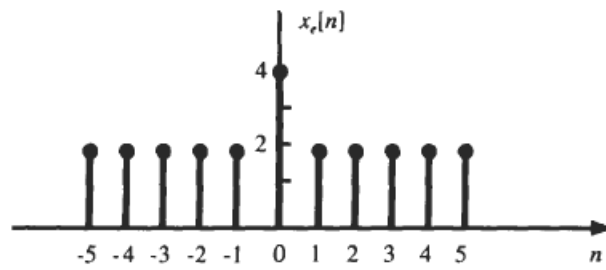


Figure 2

(i) $x[n + 2]$

(2 Marks)

(ii) $x[2n]$

(2 Marks)

(iii) $x[-2n - 2]$

(2 Marks)

(iv) $x[-n]$

(2 Marks)

Question 2

- (a) Find the signal energy for

$$x(t) = e^{-t}u(t)$$

(2 Marks)

- (b) Determine whether or not each of the following signals is periodic. If a signal is periodic, determine its fundamental period.

(i)
$$x[n] = \cos \frac{\pi}{3}n + \sin \frac{\pi}{4}n$$

(3 Marks)

(ii)
$$x[n] = e^{j\left[\left\lfloor \frac{n}{4} \right\rfloor - \pi\right]}$$

(3 Marks)

(iii)
$$x[n] = \cos\left(\frac{\pi n}{4}\right) + \sin\left(\frac{\pi n}{8}\right) + 2\cos\left(\frac{\pi n}{2}\right)$$

(3 Marks)

- (c) Using the discrete-time signals
- $x_1[n]$
- and
- $x_2[n]$
- shown in
- Figure 3**
- , represent each of the following signals by a graph and by a sequence of numbers.

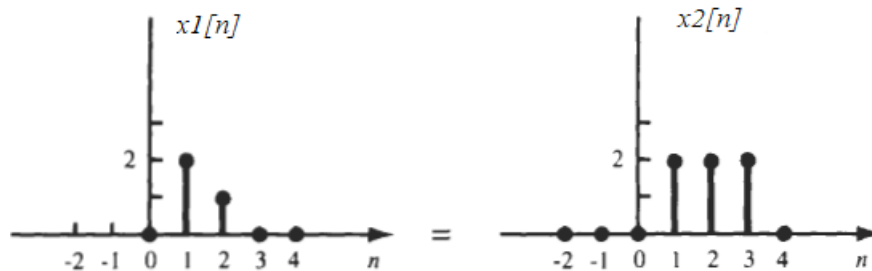


Figure 3

(i)
$$y_1[n] = x_1[n] - x_2[n]$$

(3 Marks)

(ii)
$$y_2[n] = 3x_2[n]$$

(3 Marks)

(iii)
$$y_3[n] = 2x_1[n]x_2[n]$$

(3 Marks)