

SECTION A : 60 MARKS
BAHAGIAN A : 60 MARKAH

INSTRUCTION:

This section consists of **2 (TWO)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi 2 (DUA) soalan berstruktur. Jawab semua soalan.

QUESTION 1
SOALAN 1

CLO1
C3

(a) Figure A1(a) shows discrete-time signal $x_1[n]$ and $x_2[n]$, sketch the graph of

$$y_1[n] = x_1[n] + x_2[n], \quad y_2[n] = 2x_2[n] \text{ and } y_3[n] = 2x_1$$

Rajah A1(a) menunjukkan isyarat masa berdiskrit $x_1[n]$ and $x_2[n]$, lakarkan graf bagi

$$y_1[n] = x_1[n] + x_2[n], \quad y_2[n] = 2x_2[n] \text{ and } y_3[n] = 2x_1$$

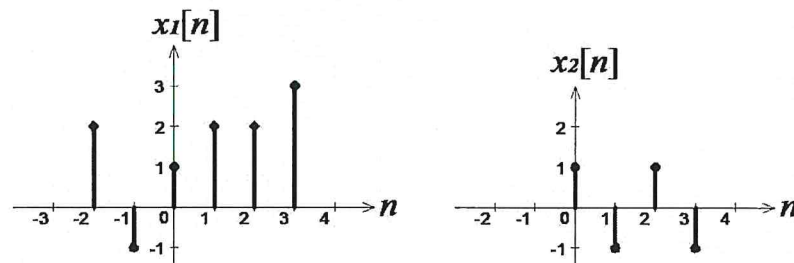


Figure A1(a)/Rajah A1(a)

[10 marks]

[10 markah]

(b) Based on Figure A1(b) the discrete-time signal $x(n)$ given, sketch the signal of $x(n+3)$, $x(2n)$, and $x(-n)$.

CLO1
C3

Berdasarkan kepada Rajah A1(b) menunjukkan isyarat masa berdiskrit $x(n)$ yang diberi, lakarkan graf bagi $x(n+3)$, $x(2n)$ dan $x(-n)$

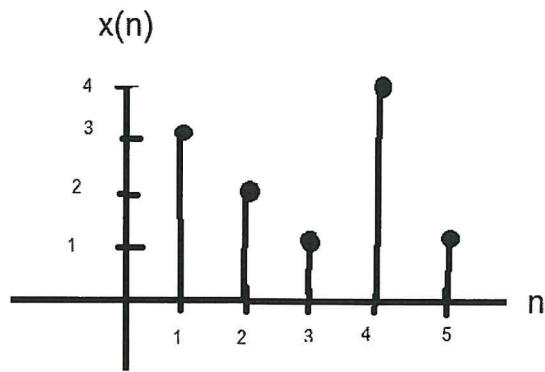


Figure A1(b)/Rajah A1(b)

[10 marks]

[10 markah]

(c) Referring to continuous-time signal $x(t)$ shown in Figure A1(c), express $x(2t)$, $x(t/2)$ and $x(-t)$.

CLO1
C3

Merujuk pada isyarat masa selanjur pada Rajah A1(c) $x(t)$, ungkapkan $x(2t)$, $x(t/2)$ dan $x(-t)$.

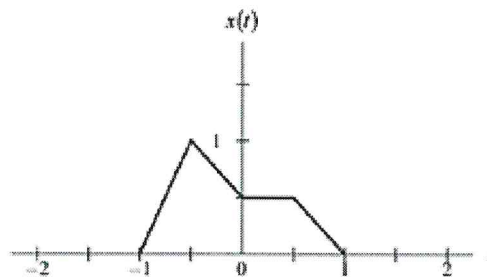


Figure A1(c)/Rajah A1(c)

[10 marks]

[10 markah]

QUESTION 2
SOALAN 2

CLO1
C3

(a) Write the expression for the impulse response related to input $x(t)$ with output $y(t)$ for the system show in Figure A2(a).

Tuliskan ungkapan untuk sambutan dedenyut berkaitan input $x(t)$ kepada output $y(t)$ untuk sistem yang digambarkan dalam Rajah A2(a).

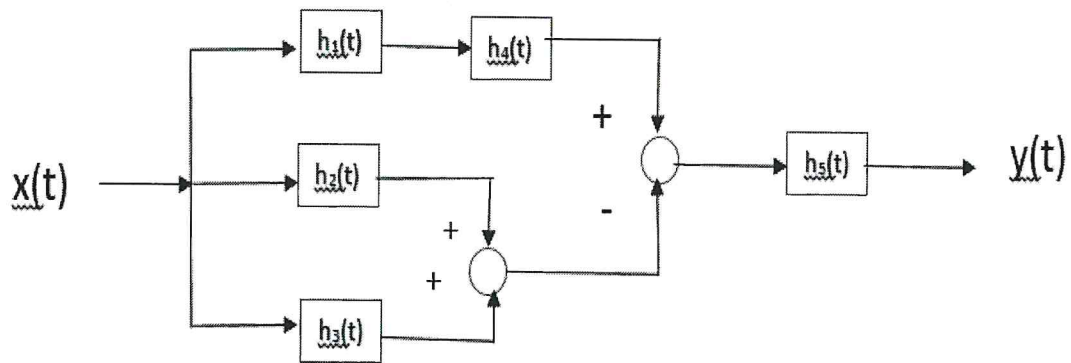


Figure A2(a) / Rajah A2(a)

[10 marks]

[10 markah]

CLO1
C3

(b) Referring to $h[n]$ and $x[n]$ given in Figure A2(b), complete the table of $y[n] = x[n] * h[n]$ by tabulation method.

*Berdasarkan kepada $h(n)$ dan $x(n)$ yang diberi dalam Rajah A2(b), lengkapkan $y(n) = x(n) * h(n)$ dengan kaedah penalaan.*

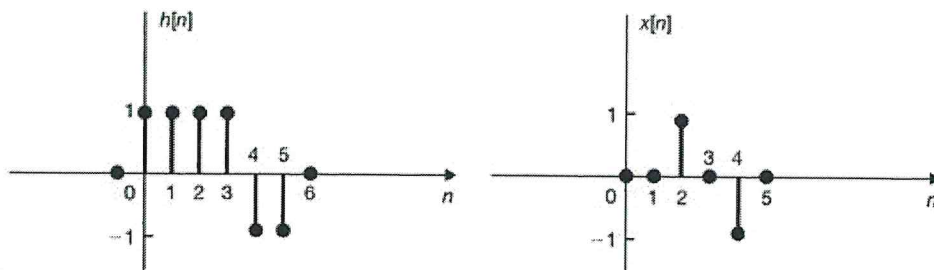


Figure A2(b) / Rajah A2(b)

[10 marks]

[10 markah]

(c) A discrete-time LTI system has the impulse response $h[n]$ depicted in Figure A2(c). Use linearity and time invariance to determine the system output $y[n]$ if the input $x[n]$ is :
Sistem LTI diskret - masa mempunyai sambutan denyut $h[n]$ yang digambarkan dalam Rajah A2(c). Gunakan kelinearan dan tak varians masa untuk menentukan keluaran sistem $y[n]$ jika masukan $x[n]$ adalah :-

$$x[n] = 3\delta[n] - 2\delta[n - 1]$$

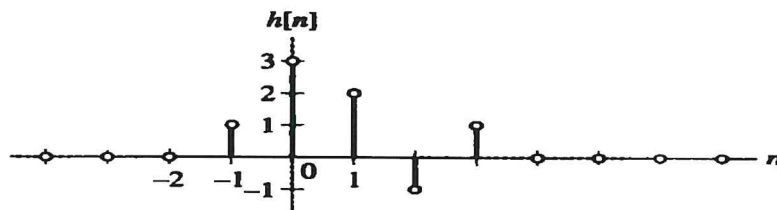


Figure A2(c) / Rajah A2(c)

[10 marks]

[10 markah]

SECTION B: 40 MARKS**BAHAGIAN B: 40 MARKAH****INSTRUCTION:**

This section consist of **TWO (2)** essay questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi DUA (2) soalan esei. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

CLO1
C4

Determine the following continuous-time LTI system to find $h(t)$, and output, $y(t)$ when the input, $x(t) = 2\delta(t)$.

Tentukan system LTI masa selangar berikut untuk mendapatkan $h(t)$ dan keluaran $y(t)$ apabila masukan adalah $x(t) = 2\delta(t)$.

$$y''(t) + 3y'(t) + 2y(t) = 2x(t)$$

[20 marks]

[20 markah]

QUESTION 2**SOALAN 2**

CLO1
C5

The RC circuit in Figure B2 is described by the differential equation.

Litar RC dalam Rajah B2 diterangkan oleh persamaan perbezaan.

$$\frac{dy(t)}{dt} + \frac{1}{RC}y(t) = \frac{1}{RC}x(t)$$

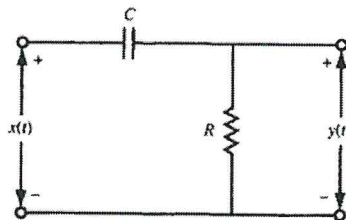


Figure B2 / Rajah B2

Evaluate the system function $H(\omega)$ of the system and the output of $y(t)$ when the input $x(t)$ is a unit impulse, $\delta(t)$.

Nilaiikan fungsi sistem $H(\omega)$ bagi sistem ini dan keluaran $y(t)$ apabila $x(t)$ adalah satu unit impuls $\delta(t)$.

[20 marks]

[20 markah]

SOALAN TAMAT