



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Examiner Only

Examination Answer Books

12 Pages

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fasten the book with the tag provided and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can only mark what is written and are not charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

1	Student Number	2410644
2	Title of Examination Paper	Signal and Systems
3	Module Code	ACDA 4009
4	Date and Time of Examination	12/05/25 9:00
5	Examination Venue	103
6	Seat Number	10
7	Number of Answer Books handed in	1

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)



13

12 Pages

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2. Enter your name in the space provided to the right, fasten the book with the tag provided, fold the flap over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can refuse to mark answers that are illegible. It is the responsibility of the candidate to ensure that the answers are legible.
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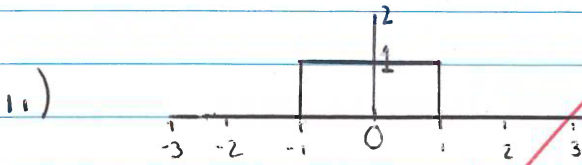
List the numbers of the questions you have attempted	Office Use
1	13
2	05
3	19
4	-0-
5	20
Total	57/100

57
100

1)

a)

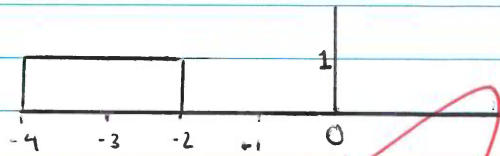
i) Unit rectangle function



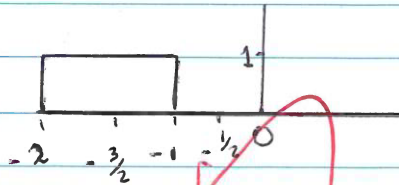
ii)

$$y(t) = x(2t+3):$$

iii)

~~iv)~~

$$y(t) = x(2t+3):$$



b)

Time shifting is the process of shifting a signal in a positive direction or negative direction. The direction can be identified in $y(t)$ equation, for example:

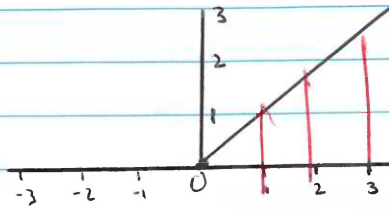
$$y(t) = x(2t+3)$$

The plus 3 indicates a shift to the left by 3 spaces

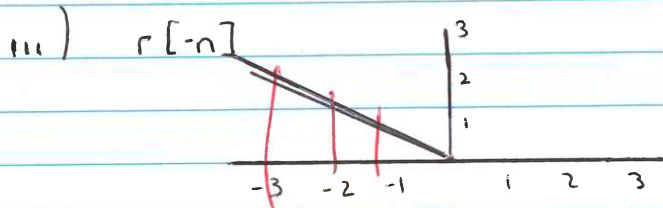
13
20

2) 3

i) Unit ramp function

 $r[n]$ 

ii)

 $r_e[n]$:

$$1 = \frac{1+0}{2} = 0.5$$

$$2 = \frac{2+0}{2} = 1$$

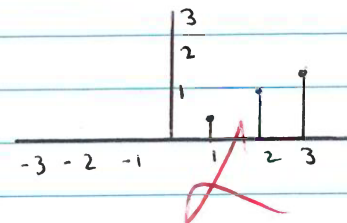
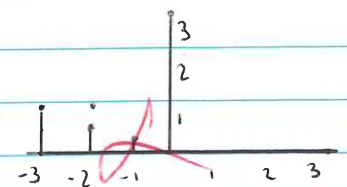
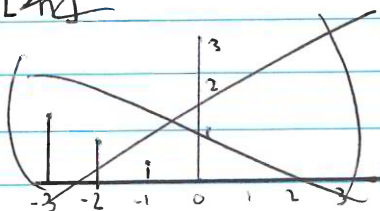
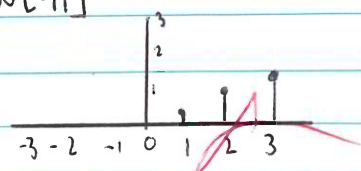
$$3 = \frac{3+0}{2} = 1.5$$

 $r_o[n]$:~~1 = 0~~

$$-1 = \frac{0 - (-1)}{2} = 0.5$$

$$-2 = \frac{0 - (-2)}{2} = 1$$

$$-3 = \frac{0 - (-3)}{2} = 1.5$$

 $r_e[n]$  $r_o[n]$ iv) ~~w[n]~~ $w[-n]$ 

3)

$$i) \quad h(t) = \begin{cases} 1, & 0 \leq t \leq 1 \\ 0, & 1 \leq t \leq 2 \\ 1, & 2 \leq t \leq 3 \\ 0, & \text{otherwise} \end{cases}$$

$$ii) \quad y(t) = h(t) * x(t)$$

$$y(t) = \int_{-\infty}^{\infty} x(\tau) \cdot h(t-\tau) d\tau$$

$$iii) \quad y(t) = \int_{-\infty}^{\infty} h(t-\tau) d\tau$$

$$iv) \quad \int_0^1 h(x) dx + \int_1^2 h(x) dx$$

$$[1-0] + [0]$$

$$\int_0^1 h(x) dx + \int_1^2 h(x) dx + \int_2^t h(x) dx$$

$$[1-0] + [0] + [t-2]$$

~~$$\left(\int_0^1 h(x) dx + \int_1^t h(x) dx + \int_2^t h(x) dx \right)$$~~

$$\int_0^t h(x) dx + \int_1^t h(x) dx + \int_2^t h(x) dx + \int_2^3 h(x) dx$$

$$[t] + [1-0] + [t-1]$$

$$\int_0^t h(x) dx + \int_0^1 h(x) dx + \int_1^t h(x) dx + \int_1^2 h(x) dx + \int_2^t h(x) dx + \int_2^0 h(x) dx$$

$$[t] + [1-0] + [t-1] + [0] + [t-2] + [0-2]$$

$$[t] + [1] + [t-1] + [2]$$

19
29

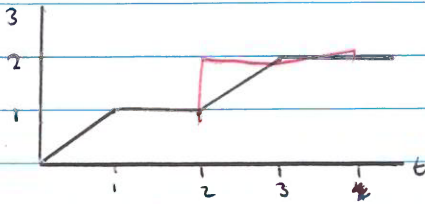
3)

v)

$$y(t) = \begin{cases} t, & 0 \leq t < 1 \\ 1, & 1 \leq t < 2 \\ t-1, & 2 \leq t < 3 \\ 2, & \text{otherwise} \end{cases}$$

3

vi)



3

4)

i)

5)

8 4 2 1 8 4 2 1
~~1 2 4 8 1 2 4 8~~

i)

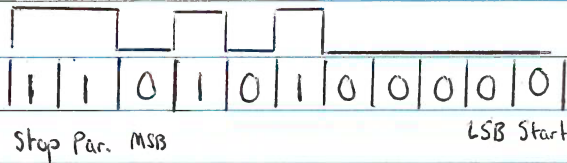
P - 50 - 0 1 0 1 0 0 0 0 ✓
 R - 52 - 0 1 0 1 0 0 1 0 ✓
 I - 49 - 0 1 0 0 1 0 0 1 ✓
 N = ~~4E~~ 4E - 0 1 0 0 1 1 0 1 ✓
 T - 54 - 0 1 0 1 0 1 0 0 ✓

5

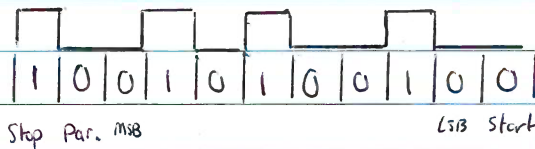
20
 20
 40

ii)

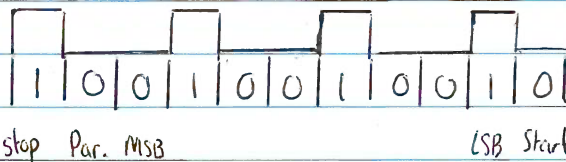
P -



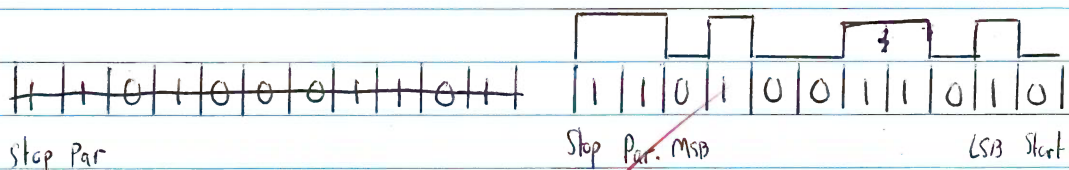
R -



I -



N -



T -



20



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Question No.

Rhif y Cwestiwn

Arholwr yn unig