



3.

1

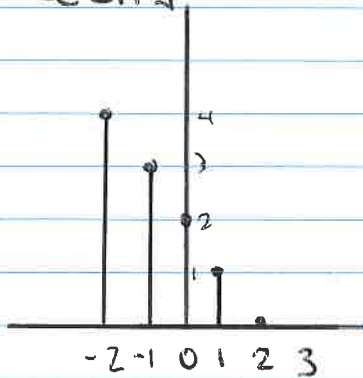
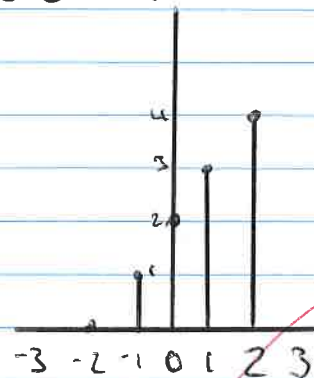
1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either read your cursive script or have it typed and the expense of typing 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	2316329
2	Title of Examination Paper	ACDA 4009 Signals & System
3	Module Code	ACDA4009
4	Date and Time of Examination	10/5/24 12:00pm
5	Examination Venue	Room 310
6	Seat Number	015
7	Number of Answer Books handed in	1

[illegible]

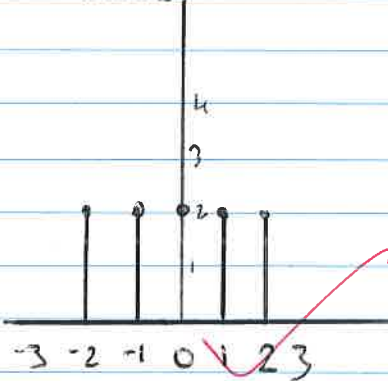
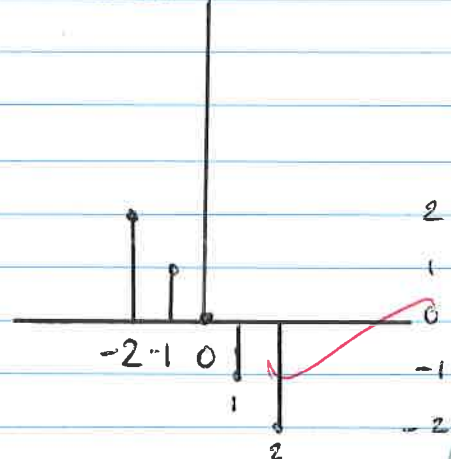
58
100

$$\frac{121}{25 \overline{) 5724}}$$

① i) $x[n]$  $x[-n]$ 

$$x_e[n] = \frac{1}{2}(x[n] + x[-n])$$

$$x_o[n] = \frac{1}{2}(x[n] - x[-n])$$

 $x_e[n]$  $x_o[n]$ 

$$ii) x_e[n] = \frac{1}{2}(x[n] + x[-n]) \rightarrow ②$$

$$x_o[n] = \frac{1}{2}(x[n] - x[-n]) \rightarrow ③$$

$$x_e[n] + x_o[n] = x[n] \rightarrow ①$$

Add ② + ③

$$x_e[n] + x_o[n] = \frac{1}{2}(x[n] + x[-n] + x[n] - x[-n])$$

$$x_e[n] + x_o[n] = \frac{1}{2}(x[n] + x[n])$$

$$\therefore x_e[n] + x_o[n] = x[n] \rightarrow ④$$

Therefore

Part iii) at back of book

$$Q_1 = 11 + 4 + 5 = \frac{20}{20}$$

(3)

i) I2C - Inter Integrated Circuits

ii) Point to multipoint transmission

iii) Used for communication between integrated circuits on a circuit board

iv) SDA - Serial Data

SCL - Serial Clock

v) IOT networks and apps

Consumer electronics like smartphones and audio processing units

IOT networks / applications and they are used in temperature sensors, humidity sensors

2/

2/

1/

(5)

2/

(2)

2/

2/

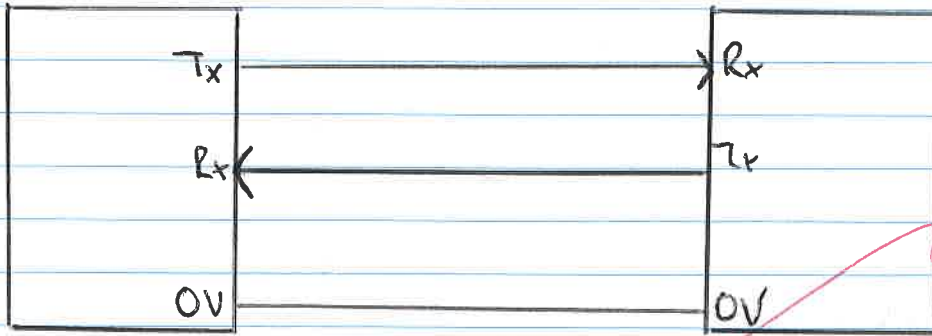
(5)

(11/90)

11/90

(4)

i)



ii) Point to point data transmission

4

2

(6)

06
20

$$q_u = \frac{b}{20}$$

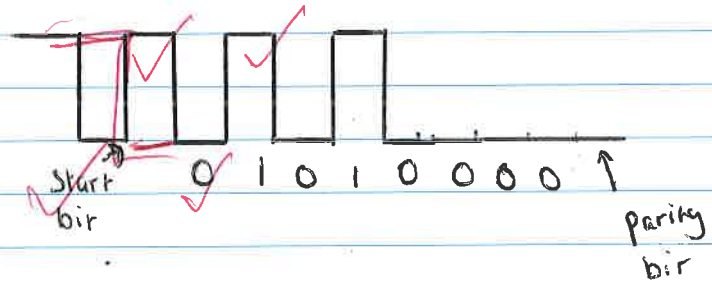
5.) 'PRINT'

		8421	8421
P	50	0101	0000 ✓
R	52	0101	0010 ✓
I	49	0100	1001 ✓
N	4E	0100	1110 ✓
T	54	0101	0100 ✓

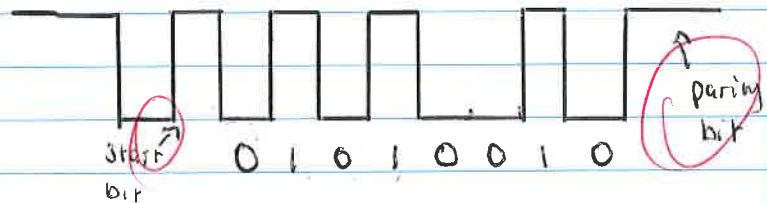
ii) MSB First

Considering odd parity

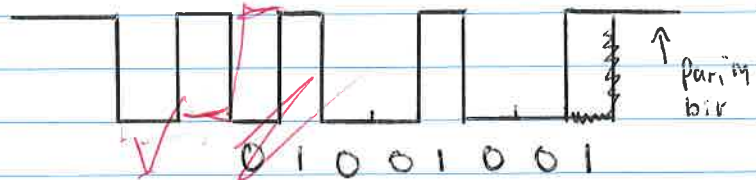
P 01010000



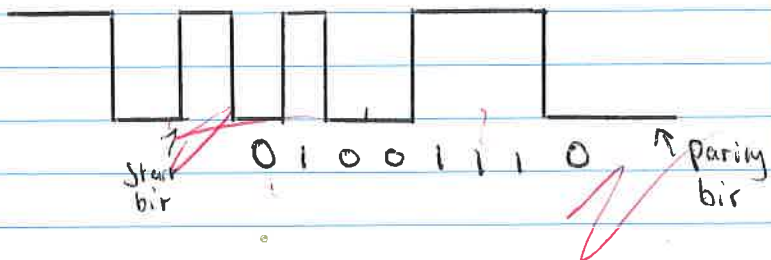
R 01010010



I 01001001

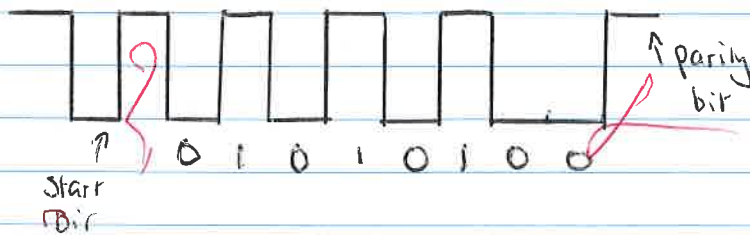


N 01001110



~~77~~

T 01010100



10
20

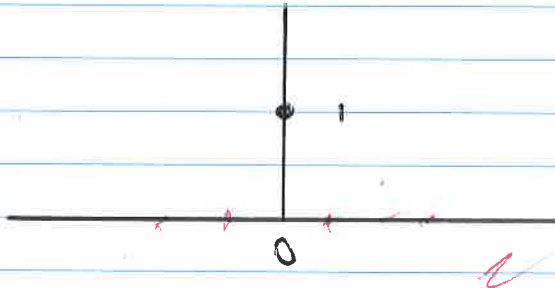
24

10
20

② a) $\delta[n] = \begin{cases} 0, & n \neq 0 \\ 1, & n = 0 \end{cases}$

i) discrete time signal ✓

ii)

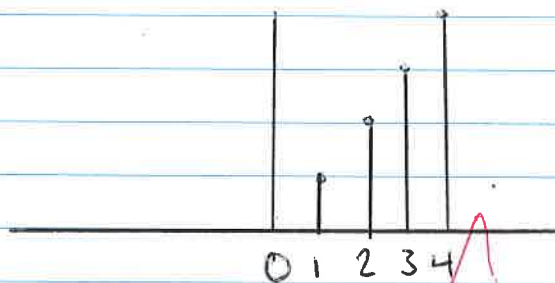


$u[t] = \begin{cases} 0, & t < 0 \\ 1, & t \geq 0 \end{cases}$

i) continuous time signal ✓

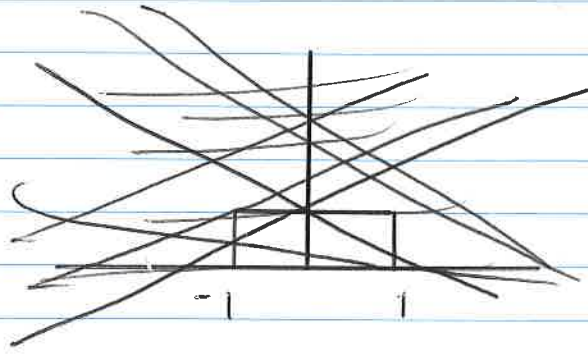
unit ramp signal

ii)

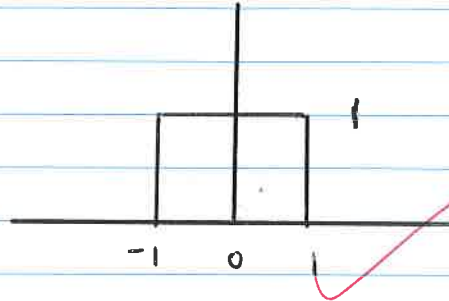


b)

i)

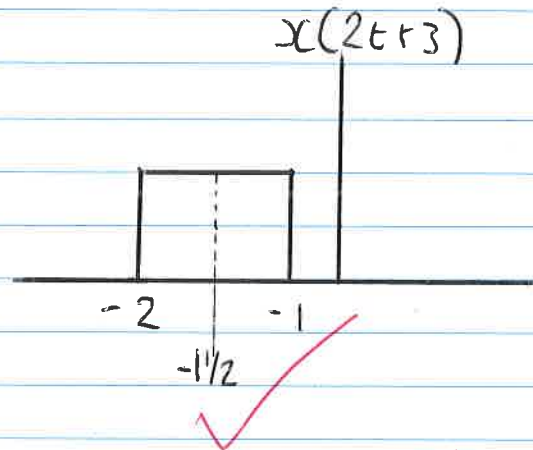
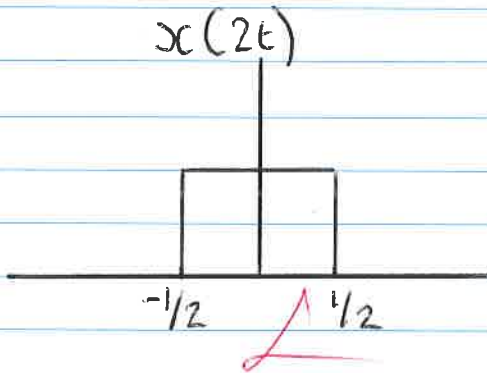


Answer



4

ii)



3

(+)

$\frac{11}{20}$

Q22 $\frac{11}{20}$

Question 1 continued

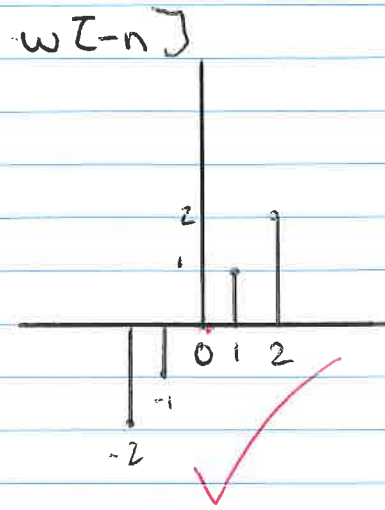
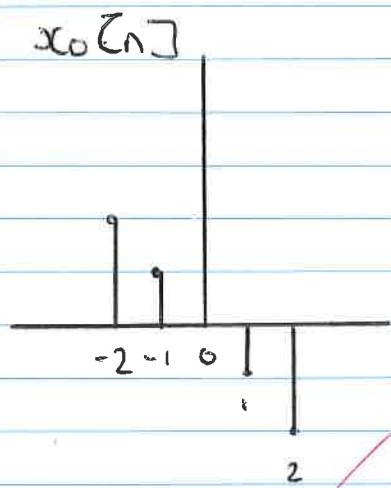
Question No.

Examiner Only

①

a)

iii)



②

1 ✓
2 ✓
3 ✓
included at the front



Question No.

Examiner Only

Arholwr yn unig

Rhif y Cwestiwn