



Sensor
is a

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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 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.**

List the numbers of the questions you have attempted	Office Use
Q2	18
Q1	29
Q3	21
Total	68/100

(Gweler yr ochr arall am y fersiwn Cymraeg)

$\frac{68}{100}$ ~~He~~

14 | 5 | 24

2.

a.) The circuit shown is a night light sensor circuit which switches on an LED if a certain light level is reached. This is achieved by using a LM393 op amp circuit.

2/1/2024
6/1/2024

Simulation

15

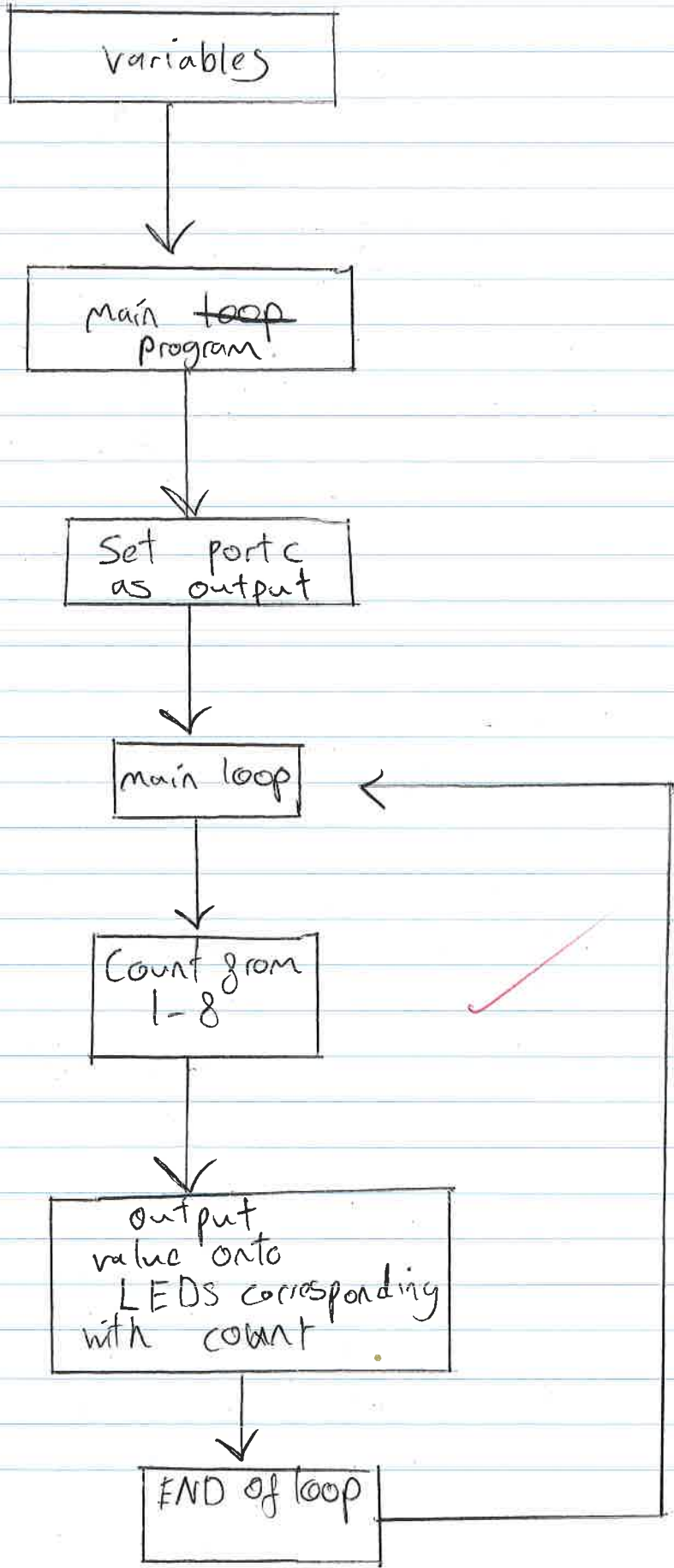
18/20

18/20

Question No.

Examiner Only

1.
a.



4 ✓

1.

2. `int count;`
`unsigned LEDS [9] = {0x00, 0x01, 0x03, 0x07, 0x0F,`
`0x1F, 0x3F, 0x7F, 0xFF};` ✓

`void main() {`

`TrisC = 0;`
`portC = 0;` ✓

`do {`

`for(count = 0; count <= 8; count++)` ✓

`{`

`portC = LEDS[count];` ✓

`delay_ms(1000);` ✓

`}`

~~`while`~~

`} while(1);`

`}`

Circuit design

simulation

code structure

working

optimization

1 ✓

4 ✓

2 ✓

4 ✓

2 ✓

8 ✓

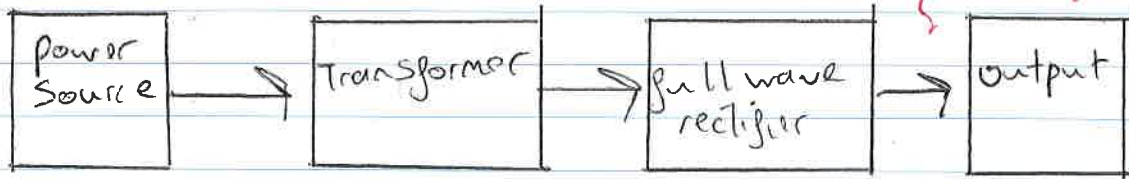
4 ✓

29
40

29
40

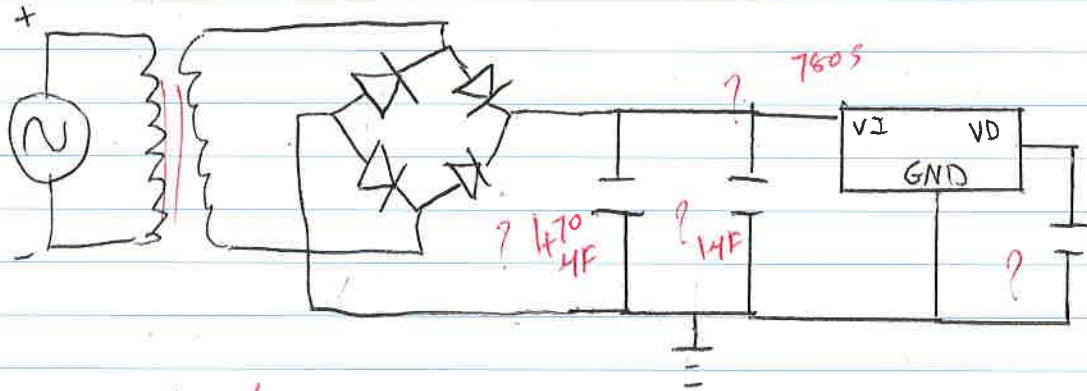
3.

a.



3

b.



2

*circuit design
Oscilloscope output*

12

7

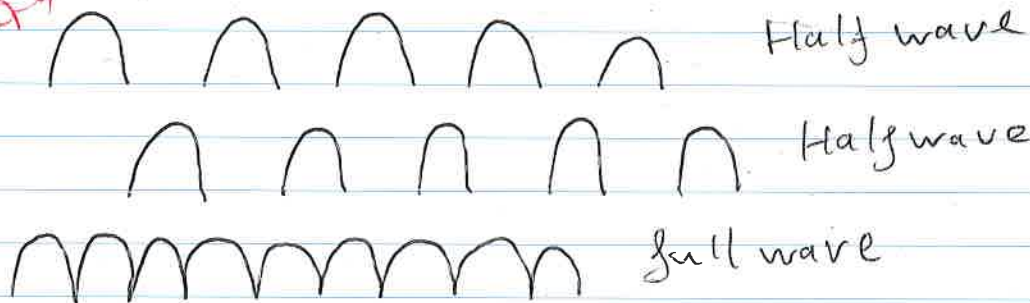
d.

ii)

The purpose of a full wave rectifier is to convert an alternating current into a direct current using diodes. A full wave rectifier does this for both the positive and negative cycles of the AC current.

2

*Only on board
partial output
12/10/2024*



A full wave rectifier works by using two half wave rectifiers which removes time between waves because it adds both the positive and negative cycles together.

1

21/40

21/40

Question No.



Examiner Only

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