



sensor circuit,
light, such as
makes the
ns. In
power

12 Pages

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 ignore illegible script or have it typed and the expense or 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.**

List the numbers of the questions you have attempted	Office Use
Q2	20
Q3	13
Q1	07-
Total	40/100

(Gweler yr ochr arall am y fersiwn Cymraeg)

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24 | 5 | 24

2. A) The circuit is a night light sensor circuit. It uses a photo sensor to activate a light, such as an LED. In the case of the circuit, it activates the LED (switches it on) in low light conditions. In addition to this, the circuit also contains a power supply ~~terminal~~ as well as multiple ground connections. One of these ground connections is connected to an amplifier. The amplifier used has its output connected to the LED. The positive input terminal of the amplifier is connected to a potentiometer. This, combined with the other resistors used in the circuit, deduces the sensitivity of the photo sensor. By decreasing the resistance of the potentiometer and resistors in the circuit, the photo sensor would be more sensitive to light, meaning the LED would activate in brighter conditions.

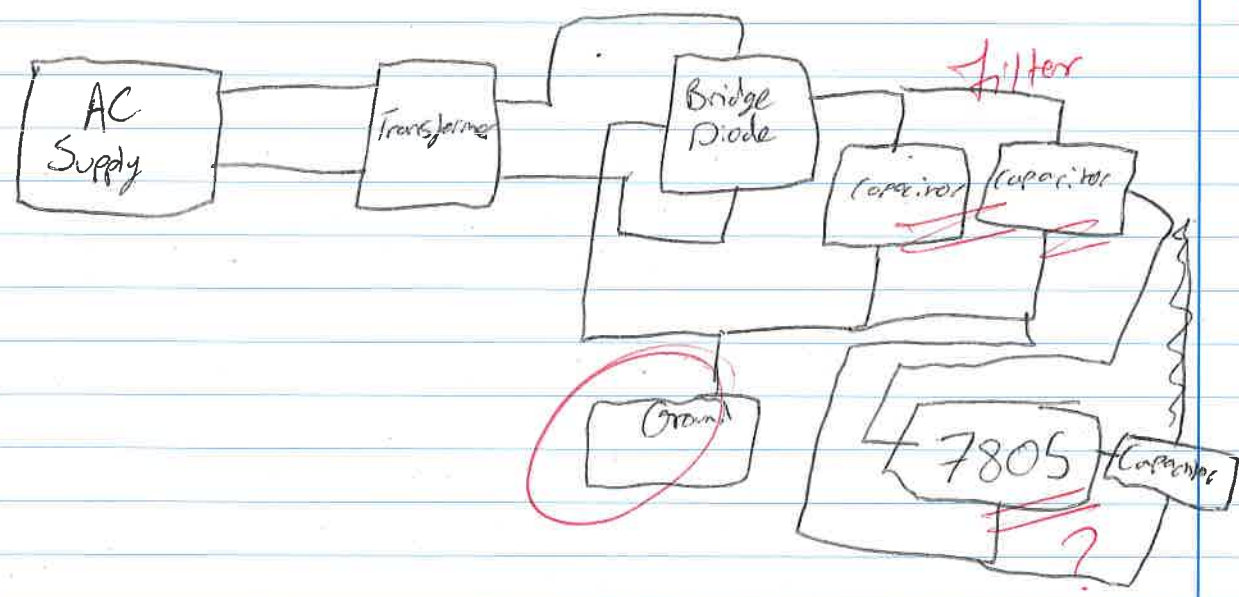
Output
PL
07/10/2019

5
5

3. A)

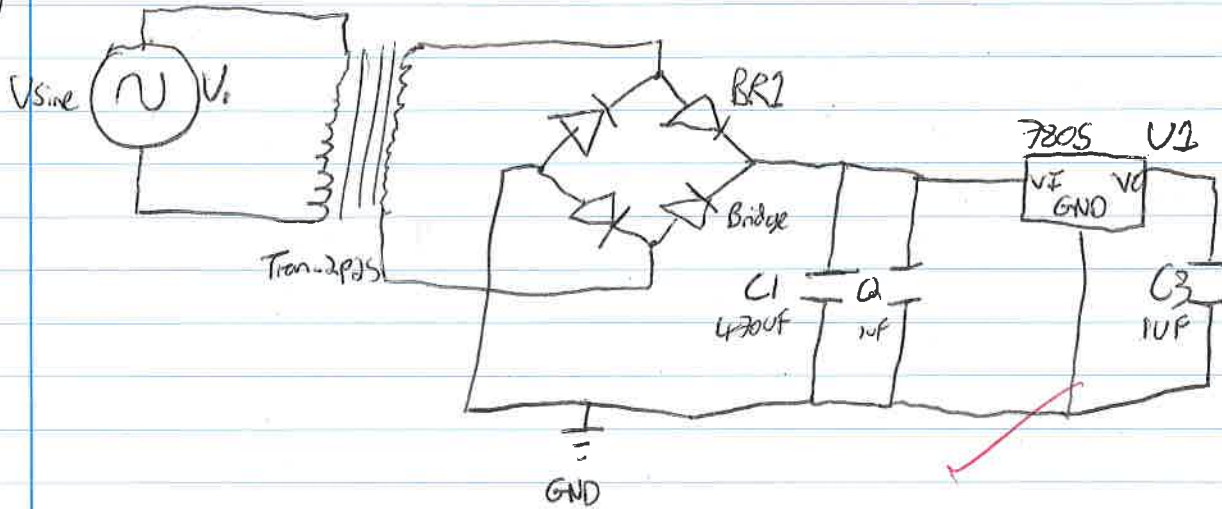
Simulation

15
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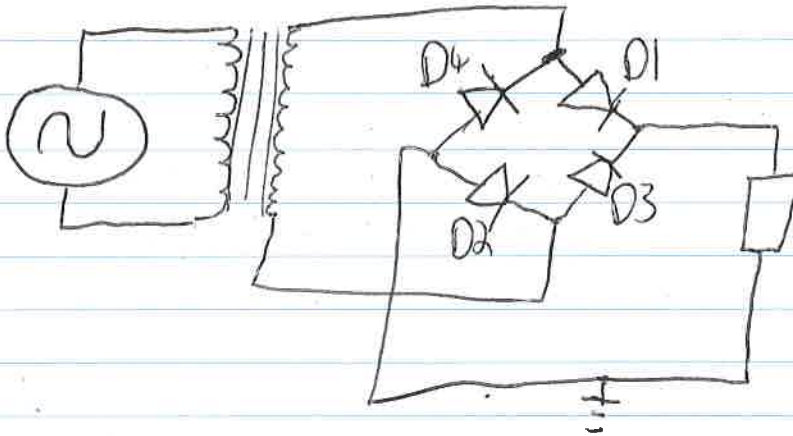


2
2

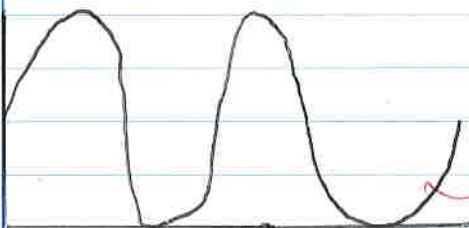
3. I)
B)



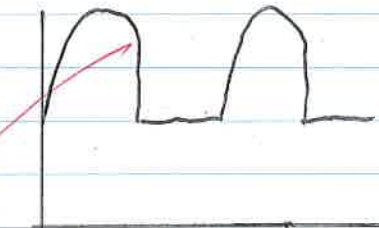
3. II)



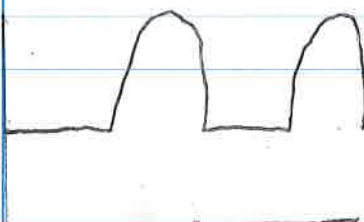
During the positive half cycle of an AC supply input, current passes through diodes D1 and D3, through the resistor and back through the transformer to the AC supply. During the negative half cycle of the AC supply, current passes through diodes D2 and D4 and returns to the supply.



Unregulated Supply



Voltage Rectified by D1 and D3



Voltage rectified by D2 and D4

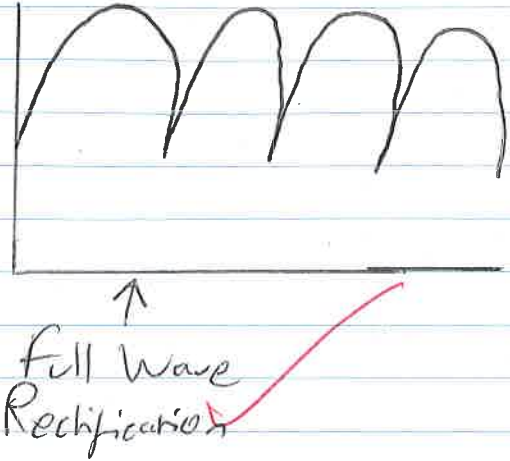


Full wave Rectification

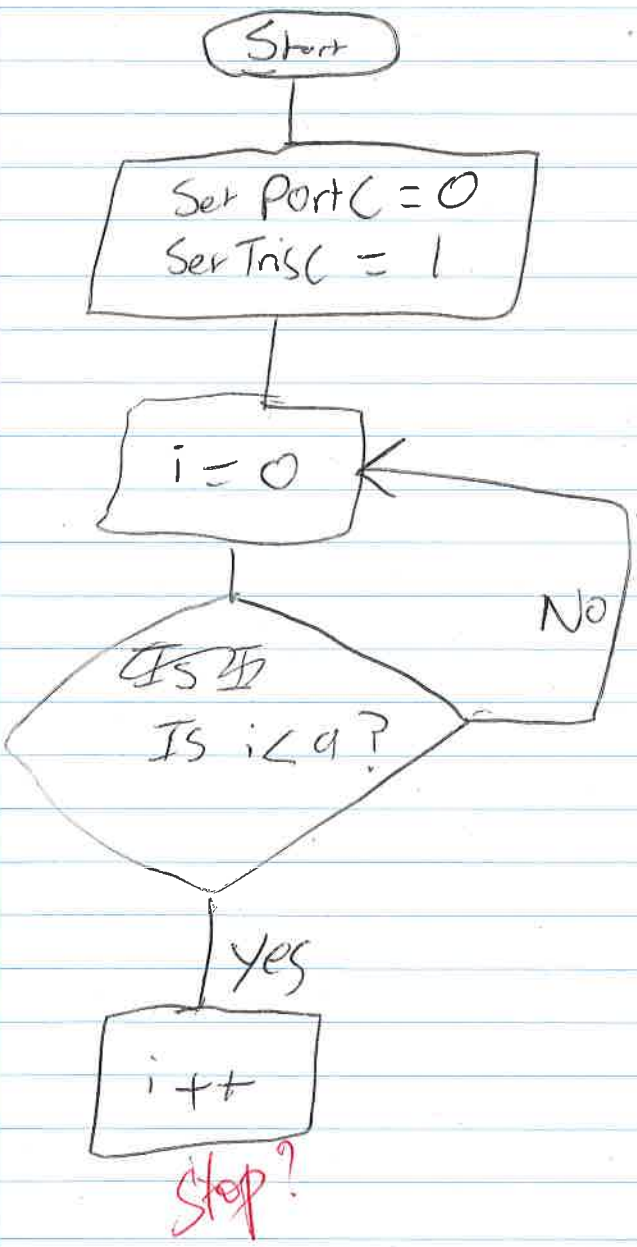


Question No.

3. II)



1. I)
A)



Examiner Only

1

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4

1.7
C)

```
int i;
unsigned upcount [9] = { 0xFF, 0xF9,
                          0xA4, 0xB0, 0x99, 0x99,
                          0x82, 0xF8, 0x20 }
```

```
void main() {
    PORTC = 0;
    TRISC = 1;
```

Comments

Code structure

```
do {
    for (i = 0; i < 9; i++)
    {
        PORTC = upcount [i];
        delay_us (1000);
    }
    while (1);
}
```

No proper files were uploaded in Moodle

07/40

7/40



Question No.

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