



First LED connected
simultaneously
to pin

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as

2

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 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	2413880
2	Title of Examination Paper	Embedded C
3	Module Code	ACDA4013
4	Date and Time of Examination	13/05/26 10:00am
5	Examination Venue	IQ206
6	Seat Number	—
7	Number of Answer Books handed in	

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)

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~~110~~

PL 1

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3)(b)(i) When the button is pressed, the first LED connected to pin RB0 illuminates while simultaneously switching off the second LED connected to pin RB1.

4

3)(b)(ii) In the PCW software, pins RB0 and RB1 are configured as outputs to drive the LEDs. Whereas, pin RB4 which the pushbutton is connected to is configured as an input. This could also be done by setting the tristates of each pin in the simulation software.

2

3)(b)(iii) RB4 is configured as an input and changes to a high logic '1' when the pushbutton is pressed, allowing power to flow through. When RB4 is at logic '1' the PIC can turn on the LED and switch off the other depending on the C program. ~~The use of the pushbutton~~

4

+13

$$\begin{array}{r} 23 \\ 25 \\ \hline \end{array}$$

from the word

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$$\begin{array}{r} 25 \\ 25 \\ \hline \end{array}$$

$$\begin{array}{r} 25 \\ 25 \\ \hline \end{array}$$

$$4 + 20 + 13 + 25 + 25$$

4) (a) When the pushbutton connected to pin RCO is pressed, the LED connected to pin RBO is turned on. In addition, the PIC uses RS232 communication protocol to send update messages via UART to the virtual terminal connected to the PIC's transmit, and receive pins, RC6 and RC7 respectively. When the button is not pressed the input polling continuously monitors the system and displays an "LED OFF" status message every 1000 ms, which changes to "LED ON" when the switch is pressed.

5 ✓

4 (d) The set_tris_b(0b11111110) instruction sets every pin of PORTB as an ~~output~~ input except from RBO which is set as '0' making it an output for the LED. Each of the 8 bits represent a pin on PORTB, with the least significant bit being RBO and the most significant bit being RB7. With a '1' making it an input and '0' making it an output.

5 ✓

4 (e) Input polling continuously monitors the system for an input being detected from the button, this means that the LED can be turned ON manually when desired instead of setting it to a timer.

2 ✓

4 (f) If a pulldown resistor isn't used with a pushbutton in the circuit, the inputs may 'float' or give false inputs to the system when the switch isn't actually set in that position.

3 ✓

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25
25



Question No.

Examiner Only

Arholwr yn unig

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