

Q1 $\frac{25}{25}$

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 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	2515292
2	Title of Examination Paper	Embedded C
3	Module Code	ACPA 4013
4	Date and Time of Examination	13.5.2026 10:00
5	Examination Venue	IQ 206
6	Seat Number	—
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
Q1	25
Q2	25
Q3	23
Q4	25
Total	98/100

(Gweler yr ochr arall am y fersiwn Cymraeg)

98
—
106

~~116~~

12 1
14/5/26

1.

- a) See uploaded files
- b) See uploaded files
- c) See uploaded files

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2.

- a) See uploaded files
- b) See uploaded files
- c) See uploaded files

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3.

- a)
 - i) See uploaded files

b)

- i) LEDs D1 + D2 are connected to pins RB0 + RB1, respectively. The push button is connected to pin RB4.

The circuit initiates with LED D2 output high and illuminated. When the push is pressed, LED D1 now changes from ~~high~~ low to high and illuminates. LED D2 changes from high to low and is off. When the push button is released LED D1 goes low and off and LED D2 goes high and on.

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- ii) The LEDs are controlled by firstly setting the tristate direction of Pins RB0 + RB1 as output. The push button pin RB4 is set as input

25+25+4

When the push button is pressed, RB4 goes high. Using polling on RB4, the switch press is detected. The program now changes the status of pins RBO + RB1 to high or low as the program dictates, illuminating or turning off the LEDs.

iii RB4 is constantly polled. When the status changes, the program can initiate sequences e.g if (input(SW))

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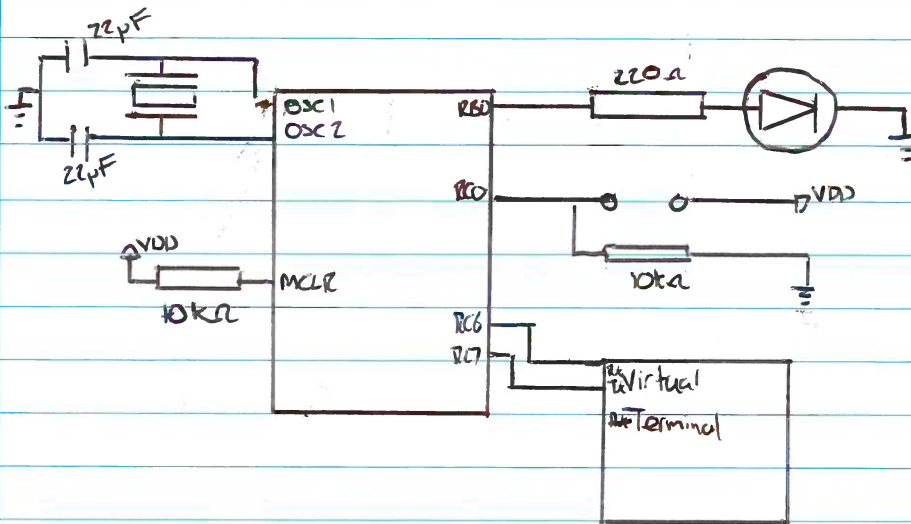
4.

- a) This program and circuit uses an LED on pin RBO and push button on pin RCO. The circuit initiates with the LED off.

When the push button is pressed, the LED illuminates and a message 'LED ON' is sent to a virtual terminal, connected to pins RC6+RC7, via UART.

If the button is not pressed, the LED is off and the message 'LED OFF' is sent to the virtual terminal via UART.

b)



- c) See uploaded files

- d) This instruction is setting all pins either as 1, high and input or 0, low and output. In this case, pins RB1 to RB7 are inputs and RBO is output.

- e) Polling continually monitors the state of an input, for this example, from a switch. It doesn't use delay which can slow the program down.

- f) If ~~no~~ no pull down resistor is used the input would have an undefined logic state.

This can be interfered by noise and give false signals and unintended operation. The pull-up or pull-down resistor gives it a definite logic state of high or low and eliminates this.

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Question No.

Examiner Only

