



Complete, fold and seal  
(see note 2 below)

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## Examination Answer Books

12 Pages

### Instructions to Candidates

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                   | 1707683/1                          |
| 2 | Title of Examination Paper       | Micros, Peripherals and interfaces |
| 3 | Module Code                      | T.B.A                              |
| 4 | Date and Time of Examination     | 08.05.19<br>1.30                   |
| 5 | Examination Venue                | Main hall                          |
| 6 | Seat Number                      |                                    |
| 7 | Number of Answer Books handed in | 1                                  |

| List the numbers of the questions you have attempted | Office Use |
|------------------------------------------------------|------------|
| Q1                                                   | 1 ✓        |
| Q2                                                   | 3 ✓        |
| Q3                                                   | 2 ✓        |
| Q4                                                   | 7 ✓        |
| Q5                                                   | 0 ✓        |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
| Total                                                | 13         |

26% ✓

2.

- b) a Subroutine has to be called for and can be used for delays and Program counters. ?

An ~~the~~ interrupt can happen at any time ✓

- c) to ensure the program resumes correctly you would need a Program counter

- a) data would be stored in the stack, this data could be pushed or pulled off the stack.  
Program counters and Subroutines have communications with the stack

3)

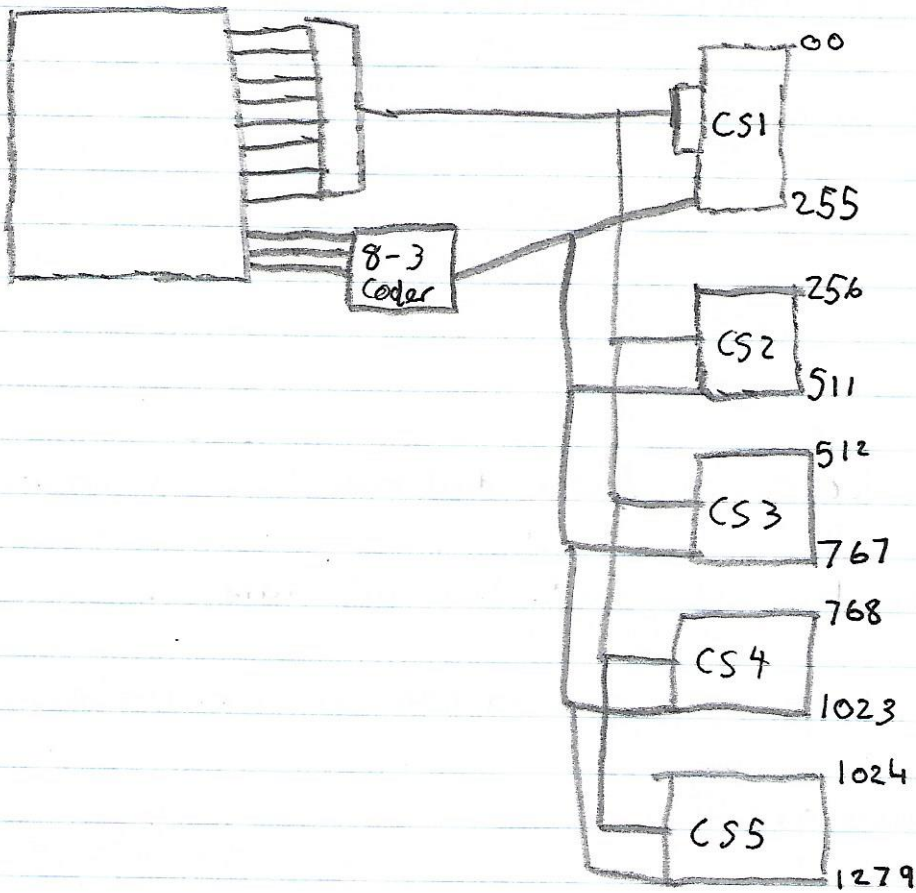
- a) it is not possible to connect an a.c load directly to the pic due to the load being too much and blowing the board
- d) you would use an optocoupler to electrically isolate.



- b) you would use an optocoupler, once the switch is made the photons go ~~on~~ to the transistor which then turns it on.

4)

a



2. ✓

|   | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|----|---|---|---|---|---|---|---|---|---|---|
|   | 0  | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
|   | 0  | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
|   | 0  | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| → | 0  | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
|   | 1  | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
|   | 1  | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
|   | 1  | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
|   | 1  | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

2 ✓

b)

| 1024 | 512 | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
|------|-----|-----|-----|----|----|----|---|---|---|---|
| 0    | 1   | 1   | 0   | 1  | 1  | 0  | 1 | 0 | 1 | 1 |

$$\begin{array}{r}
 875 \\
 - 512 \\
 \hline
 363 \\
 - 256 \\
 \hline
 107 \\
 - 64 \\
 \hline
 43 \\
 - 32 \\
 \hline
 11
 \end{array}$$

875 would be accessed on chip 4 ✓

3 ✓

5)

a) The key differences are:

- Speed
- Amount of wires
- Price
- distance

b)

i) when the Sda is high and the Scl is low ✗

ii) when both the Sda and Scl are low ✗

iii) when the lines are not in the correct position ✗

iv) 50011001100101011 ✗

1

a)

|                | W    | Count |
|----------------|------|-------|
| equ OE         |      |       |
| MovLW 0x58     | 58   |       |
| MovWF Post1    | 58   | 58    |
| MovLW 0x3A     | 61A  | 58    |
| AddWF Post1, 1 | 119A |       |

✓

c)

```

equ 0x12
;
MovLW 0x06
MovWF Count1
call delay1
call delay1
call delay1
call delay1
call delay1
Decf Count1
Goto loop
NOP
NOP

```

✓

b)

|                        | W  | Count |
|------------------------|----|-------|
| MovLW 0x05A            | 5A |       |
| MovWF <del>Post1</del> | 5A | 5A    |