



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	MOR16832611
2	Title of Examination Paper	Micros, Peripherals & Interfaces
3	Module Code	T.B.A
4	Date and Time of Examination	8.05.19 PM
5	Examination Venue	Hall
6	Seat Number	
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
Q1	3 ✓
Q2	2 ✓
Q3	5 ✓
Q4	5 ✓
Q5	1 ✓
Total	16

32% ✓

a) `Post1` `equ 0E` `W` `Post1`

`MOULW 0x58` $\rightarrow 58$

`MOVWF Post1` $\rightarrow 58 \rightarrow 58$

`MOULW 0x3A` $\rightarrow 3A$

`ADDWF Post1,1`

$\rightarrow$
$$\begin{array}{r} 58 \quad 0101 \quad 1000 \\ 3A \quad + 0011 \quad 1010 \\ \hline 1001 \quad 0010 \end{array}$$

$Z = 0$ ✓

$DC = 1$ ✓

$C = 0$ ✓

9 2

3.

✓

b) `DATA1` `equ 0x14` `W` `DATA1`

`MOULW 0x5A` $\rightarrow 5A$

`MOVWF DATA1` $\rightarrow 5A \rightarrow 5A$

`RLF DATA1`

`INCF DATA1`

`RLF DATA1`

`INCF DATA1`

0 ✓

c) `Count1` `equ 0x12` `W` `Count1`

`MOULW 0x06` $\rightarrow 06$

`MOVWF Count1` $\rightarrow 06 \rightarrow 06$

`CALL DELAY1`

`DECF Count1`

`GOTO Loop`

`NOP`

`NOP`

0 ✓

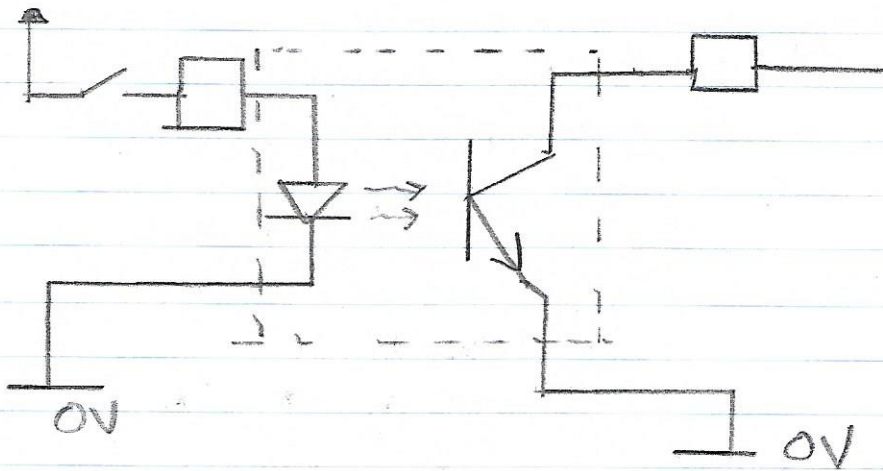
a) The program would have a 8×3 Decoder ✓

b) Subroutines are called by a program for example a delay. Interrupt routines are called by an external source for example pressing a key on a keyboard. They are used to execute commands with microcontroller programs ✓

2 ✓

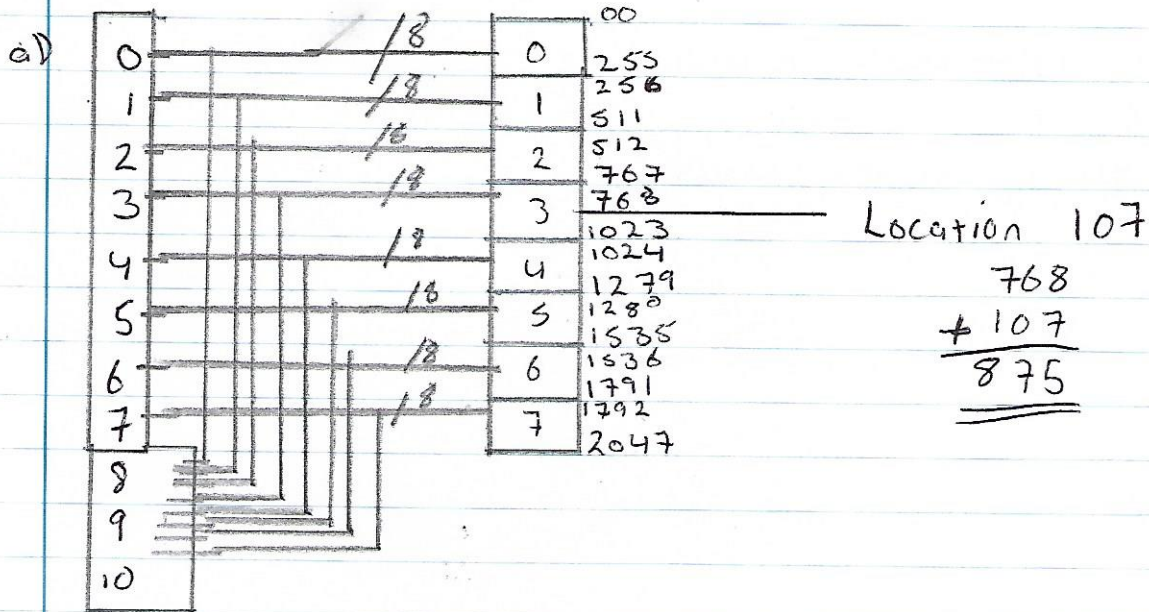
a) You cannot connect an a.c. load directly to the output of a 16F84A PIC because the current pulled by the load would destroy the PIC.

b) Use of an, Opto-coupler would be a suitable solution as it's a non contact device that uses light to switch.



c)

d) You would connect a Switched input to a PIC using a relay. ~~connect~~ So that the electrical circuit remains isolated from the PIC preventing any damage to the PIC.



875 $\Rightarrow$

	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	1	1	1	1	1	1	1	0
1	0	0	0	1	1	1	1	1	1	0	1
2	0	1	1	1	1	1	1	1	0	1	1
3	0	1	1	1	1	1	1	0	1	1	1
4	1	0	0	1	1	1	0	1	1	1	1
5	1	0	0	1	1	0	1	1	1	1	1
6	1	1	1		0	1	1	1	1	1	1
7	1	1	1	0	1	1	1	1	1	1	1

b)

	1024	512	256	128	64	32	16	8	4	2	1
875	0	1	1	0	1	1	0	1	0	1	1

- a. 4 Key Differences between RS232 & SPI
- Speed
 - Number of wires used.

b_i) Start

b_{ii}) END

b_{iii}) Sends the message back

b_{iv}) ~~S 001100110011~~

S 0011001100110011

X