

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.**

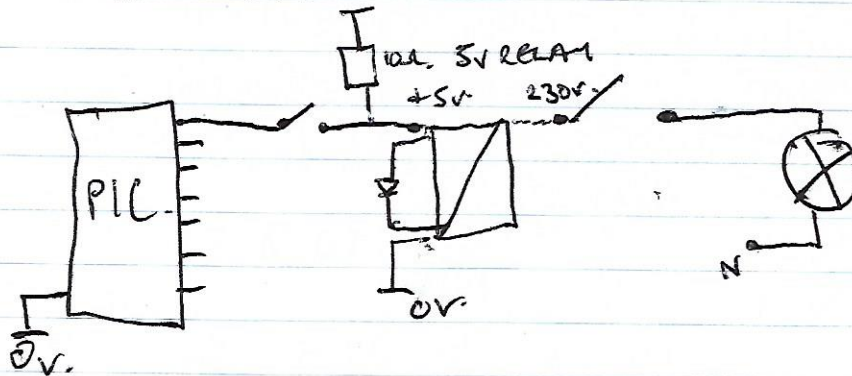
1	Student Number	1707685 / 1
2	Title of Examination Paper	MICRO'S, PERIPHERALS AND INTERFACES
3	Module Code	T.B.A
4	Date and Time of Examination	08.05.19 1.30 PM.
5	Examination Venue	HALL.
6	Seat Number	
7	Number of Answer Books handed in	

[illegible]

(3)

a) IF AN A.C LOAD WAS CONNECTED DIRECTLY TO THE OUTPUT OF PIC IT WOULD MOSTLY LIKELY DAMAGE THE PIC. THE PIC WOULD BE UNABLE TO MANAGE THE CURRENT AND SHORT CIRCUIT.

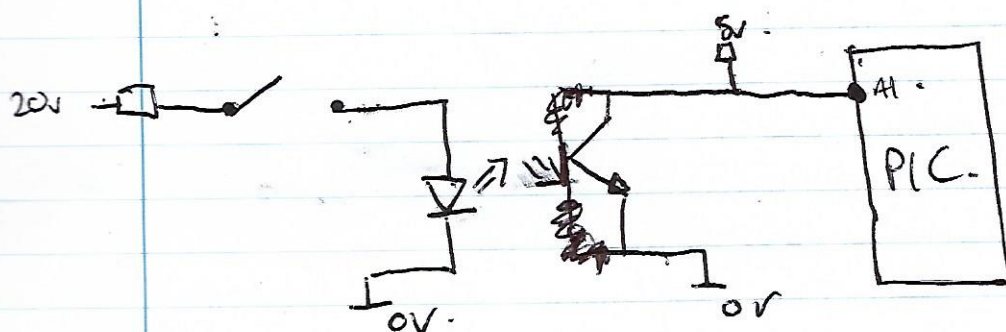
b) AS THE QUESTION ABOVE ~~STAM~~ EXPLAINS A PIC COULD NOT DIRECTLY CONTROL THE ON OFF STATE OF 230VAC LAMP. IN ORDER TO SUITABLY SWITCH THE LAMP A SMALL CONTROL RELAY COULD BE USE. THE PIC COULD PRODUCE THE VOLTAGE TO ENERGISE THE RELAY'S COIL. CLOSING A N/O CONTACT WHICH CAN BE SUITABLY RATED FOR THE CURRENT OF THE LAMP.



c) WHEN READING SWITCHED INPUTS A RESISTOR SHOULD BE USED ON THE LINE AFTER THE SWITCH TO BALANCE OUT AN FALSE INPUTS.

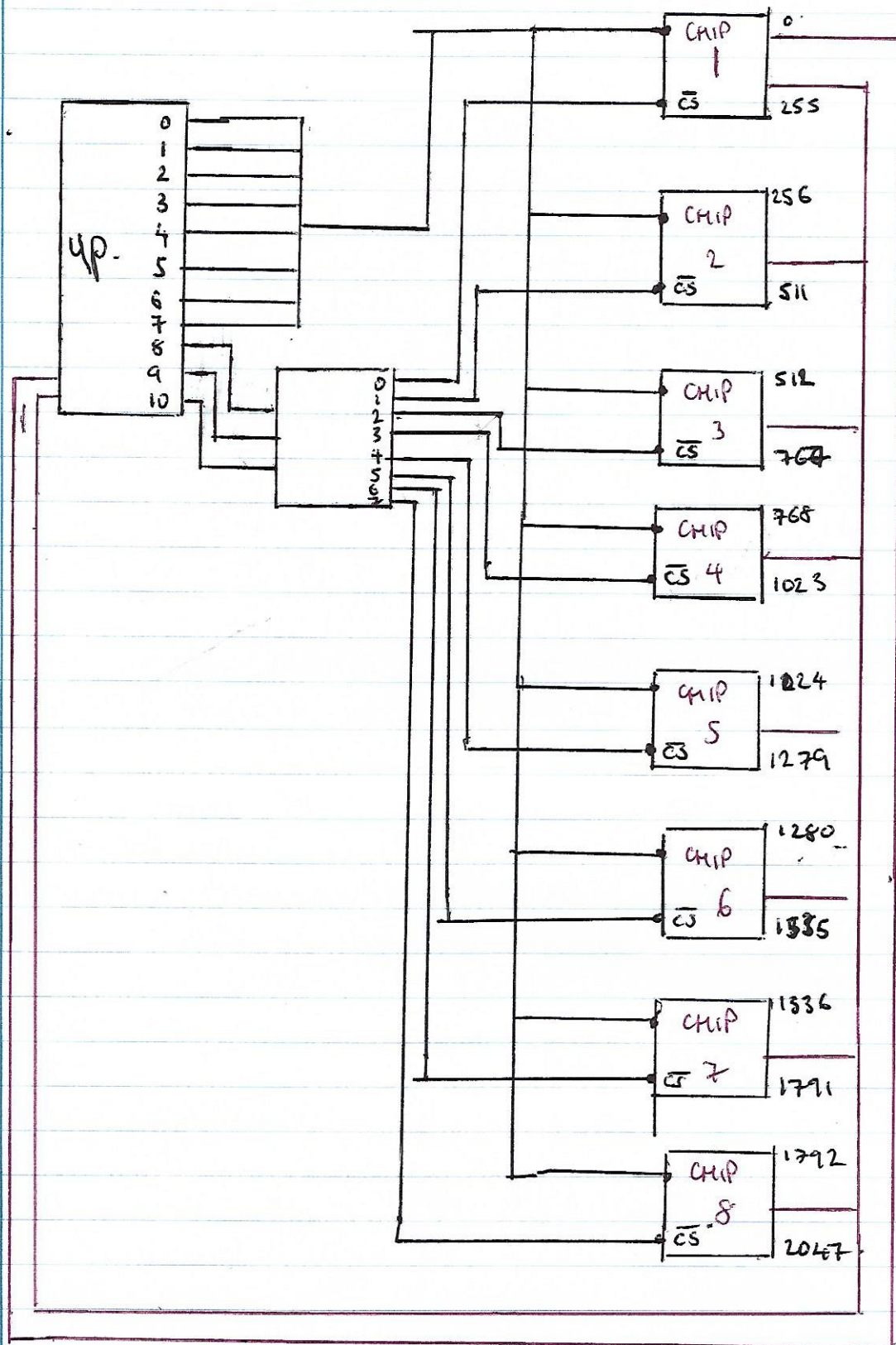
Question No
3

- d) IN ORDER TO CONNECT A SWITCHED INPUT TO A PIC AND ENSURE THE SWITCH IS ELECTRICALLY ISOLATED FROM THE PIC A OPTOCOUPLER CAN BE USED. ALSO KNOWN AS A OPTOISOLATOR. SEE DRAWING BELOW.



4

a).



TO CONNECT THE ENTIRE MEMORY CAPABILITY, A 3-8 DECODER CAN BE USED AS SHOWN ABOVE.

(4)

b) MEMORY LOCATION 875

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

THE FIRST 3 ~~bits~~ BITS SHOW US THAT THE MEMORY LOCATION IS IN CHIP 4, THEN THE FOLLOWING 8 BITS SHOW THE MEMORY LOCATION ON THAT SPECIFIC CHIP IS 107. ✓

MEMORY LOCATION 875.

0 11 0 11 0 1 0 11.

(2)

- a) THE STACK IS USED TO STORE THE PROGRAM COUNTER FOR MAIN PROGRAM AND PUSH AND POP THE INFORMATION TO IF. IF IT ONLY HAS 8 LOCATIONS, THEN YOU WOULD ONLY BE ABLE TO HAVE THAT MANY SUB ROUTINES AND INTERRUPTS GO INTO IF AT ANY TIME.

- b) SUB ROUTINE.

A SUBROUTINE IN MICROCONTROLLER IS A FUNCTION OR ~~ANOTHER~~ PIECE OF PROGRAM THAT IS CALLED AT A PREDETERMINED POINT IN THE MAIN PROGRAM. SUB ROUTINES ARE USEFUL TO REDUCE THE OF CODE IN THE MAIN PROGRAM. AN EXAMPLE OF A SUBROUTINE CAN BE A DELAY IN A PROGRAM, THEN RETURN BACK TO THE MAIN LOOP.

INTERRUPTS.

AN INTERRUPT IN A MICROCONTROLLER CAN BE A HARDWARE OR SOFTWARE SIGNAL THAT ISN'T PART OF YOUR MAIN PROGRAM, BUT COULD BE FLAGGED IN THE PROGRAM WHENEVER THE INTERRUPT COMMANDS. AN EXAMPLE OF A INTERRUPT COULD BE A LIMIT SWITCH. ONCE FLAGGED THE INTERRUPT WILL CHECK ALL SAFETY DEVICES, IF OK WILL HAND BACK TO THE NEXT POINT IN THE PROGRAM. IF NOT SAFE WILL BRING UP AN ALARM.

(2)

c) IN ORDER TO ENSURE THE PROGRAM RESUMES IN A CORRECT STATE FOLLOWING AN INTERRUPT, YOU WOULD INCLUDE ISR. ✓

①

a) POST 1 EQU 0E.

MOV LW 0x58 W 0E
 MOV WF POST1 58
 MOV LW 0x3A 3A
 ADD WF POST1, 1 3A + 58

3A 0011 1010
 58 10110101000.
 010010010

Z = 0

C = 0

OC = 1.

b) Data1 equ 0x14.

MOV LW 0x5A W 0x14.
 MOV WF DATA1 5A

RLF DATA1 S A
 INCF DATA1 0 01011010.
 RLF DATA1 0 10110100.
 INCF DATA1 0 10110101.
 RLF DATA1 1 01101010.
 INCF DATA1 1 01101011.

MEMORY LOCATION 14 = 101101011.

①

c)

```
MOVLW    0x06  
MOVWF    Count1.  
CALL     Delay1  
CALL     Delay1  
CALL     Delay1  
CALL     Delay1  
CALL     Delay1.  
DECF     Count1.  
GOTO     Loop.
```

~~for~~

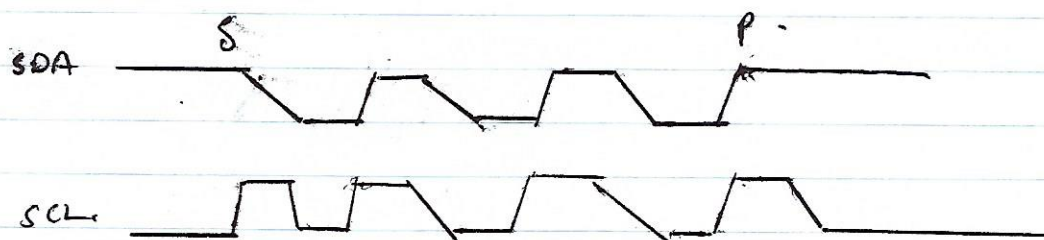
(5)

- a)
- RS232 IS ASYNCHRONOUS SPI IS SYNCHRONOUS. ✓
 - RS232 USES MORE WIRING THAN SPI. ✓
 - SPI IS FASTER THAN RS232. ✓
 - RS232 IS SLOWER BUT IS ~~EASIER~~ BETTER OVER LARGER DISTANCE. THAN SPI. ✓

b)

- i) THE MASTER SENDS AN "S" SIGNAL WHEN DUE TO BEGIN SENDING MESSAGES. ✓
- ii) THE MASTER SENDS A "P" SIGNAL WHEN FINISHED. ✓

i + ii) THE SDA IS HELD HIGH THEN IS DRIVEN LOW WHEN ABOUT TO SEND AND IS THEN DRIVEN HIGH AGAIN WHEN FINISHED.



(5)

b)

iii)

THE SLAVE SENDS A NACK SIGNAL
WHEN NOT READY TO ACKNOWLEDGE
THE MASTER. ✓

iv)

S 00110011 A 11101011 A P. ✓