



Complete, fold and seal
(see note 2 below)

SURNAME: Hunt

FORENAME(S): Samuel

Examination Answer Books

12 Pages

Instructions to Candidates

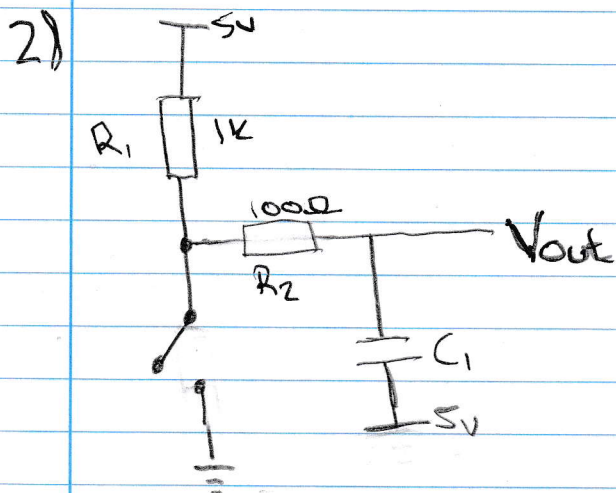
1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold the paper over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either ignore illegible script or have it typed 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	
2	Title of Examination Paper	MICROS PERIPHERALS AND INTERFACE
3	Module Code	
4	Date and Time of Examination	8/1/25
5	Examination Venue	
6	Seat Number	007
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
1	10
2	10
3	3
4	10
5	5
6	3 1/2
	4 1/2
	x2
Total	83%

10
10
3
10
5
3 1/2
4 1/2

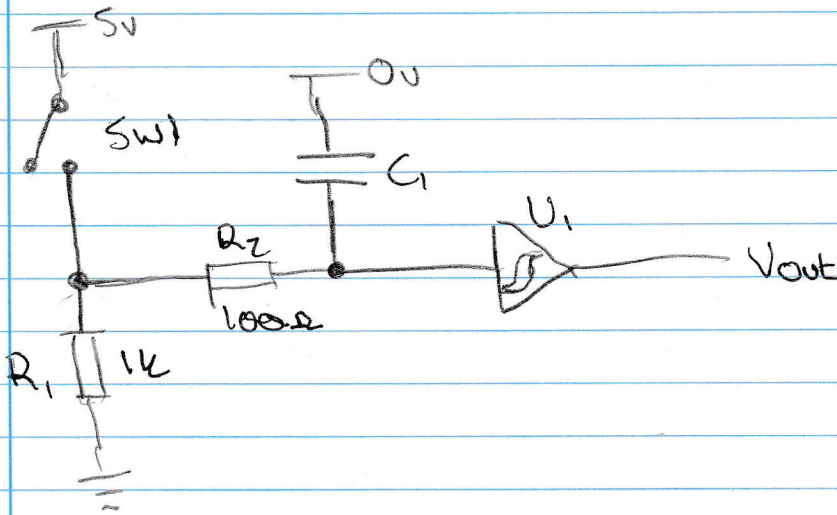
- 1 a) RETURN - Return from a given Subroutine back to the calling ~~ing~~ 2
- b) SLEEP - Shut down the microcontroller until a specified interrupt ~~or~~ is triggered 2
- c) ADDLW - Add literal to Working - Adds a specified value to the value held in the working register 2
- d) BCF f, b - Bit clear file f, bit - Clear (set to 0) bit b in file f 2
- e) DECF - Decrement file - Decrements the value held in a file. 2



The circuit to the left shows a normally high circuit which will be pulled to ground when triggered.

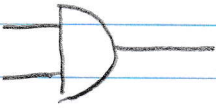
The bouncing is reduced through a ~~high~~ low pass filter, which will short any high frequencies to ~~ground~~ ^{5V}.

R_1 is used to prevent large amounts of current flowing to the micro / ground. It also acts as a pull up resistor. R_2 & C_1 form the low pass filter, which will eliminate the high frequency bouncing, due to C_1 blocking low frequency signals & transmitting high frequency ones to allow 5V to eliminate it.



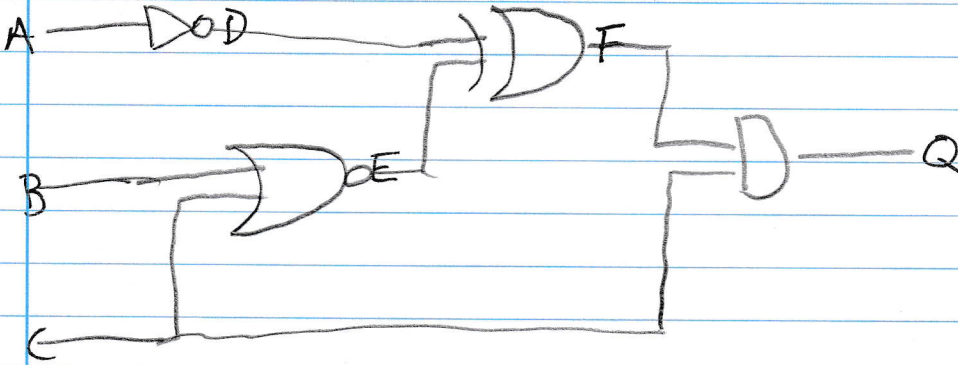
The circuit above is normally low, and uses a low pass filter to smooth out any signals at higher frequencies. Also, it makes use of a Schmitt trigger to reduce the noise that may be produced by the circuit / input. SW1 will allow current to flow into the filter & some to ground. R_1 is a pull down resistor to remove any excess voltage when SW1 is open. R_2 & C_1 filter out any noise, shorting higher frequencies to ground. U_1 will take the filter output and use hysteresis to prevent excess noise passing.

3)

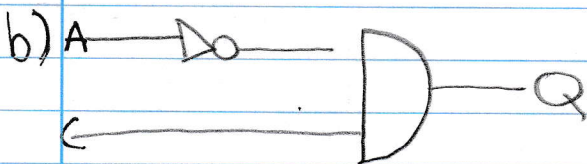


A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

4) a)

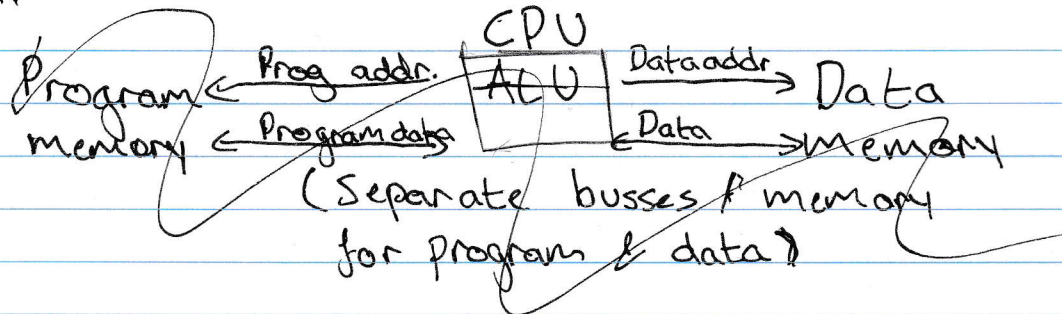


A	B	C	D	E	F	Q
0	0	1	1	0	1	1
0	1	0	1	0	1	0
0	1	1	1	0	1	1
1	0	0	0	1	1	0
1	0	1	0	0	0	0
1	1	0	0	0	0	0
1	1	1	0	0	0	0
0	0	0	1	1	0	0

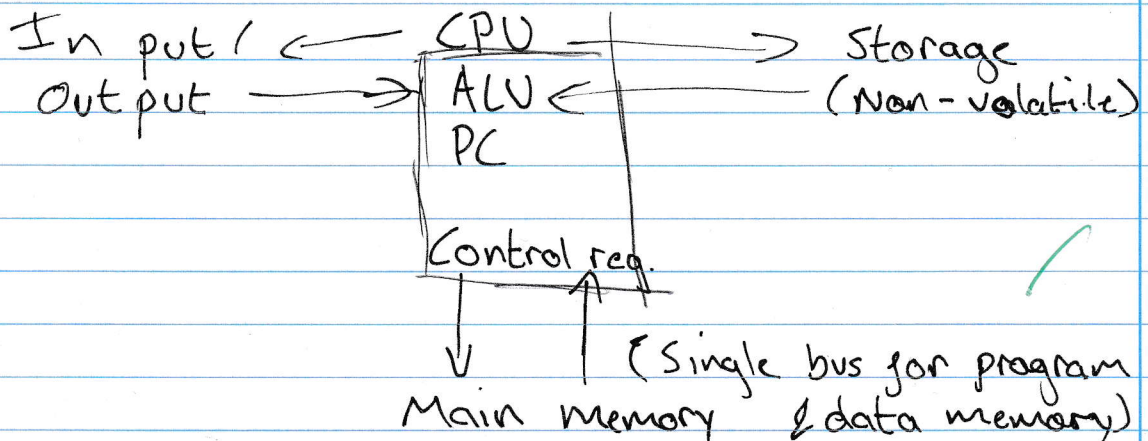


5) Harvard

Ignore this diagram, look on page after Q. 6



Von Neumann

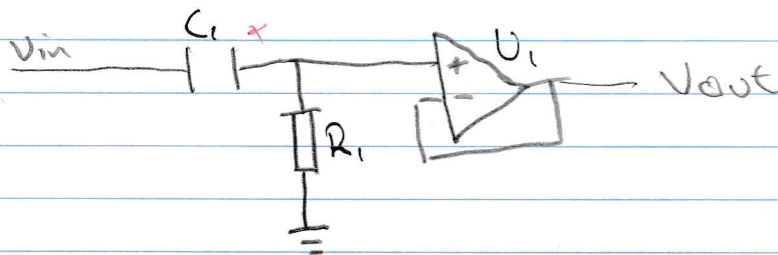


Harvard is faster due to the busses being harder to saturate.

Von Neumann is ^{Cheaper} ~~less memory~~ due to the simpler design, less busses needed and less memory needed.

(+2)
5

- 6) A PWM signal can represent a digital signal through the duty cycle of the signal. A fairly simple circuit could incorporate a capacitor, which would accumulate the charge of the signal dependent on its PWM. This could then be held using an op-amp. This could then use an op-amp to ensure that the current, ^{discharged} from the capacitor wouldn't deplete it too quickly.



C_1 would store the charge from the PWM signal, which would induce a voltage on U_1 , which is a unity gain op-amp. R_1 is used to discharge the voltage to prevent floating. C_1 & R_1 can be tuned to the frequency of the output, creating a constant voltage.

5)

