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Complete, fold and seal
(see note 2 below)

SURNAME: S

FORENAME(S): LOUIS

Examination Answer Books

12 Pages

Instructions to Candidates

- Please give the information requested in the boxes below.
- Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
- 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.
- Write your answers in ink.
- Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
- No part of this book is to be torn out; it must be handed in complete.
- If more books than one are used, fasten them together using the tags available from the invigilator(s).
- 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	2322688
2	Title of Examination Paper	Micro Rhythms & interfaces
3	Module Code	ACDA4004
4	Date and Time of Examination	8/1/25 9:00 am
5	Examination Venue	Room 310
6	Seat Number	029
7	Number of Answer Books handed in	1

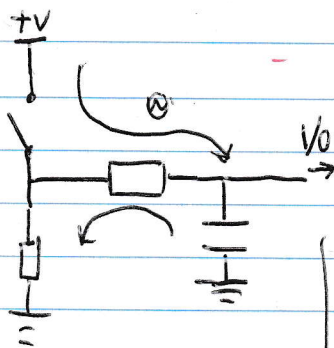
List the numbers of the questions you have attempted	Office Use
1	7
2	8
3	3
4	7
5	5
6	0
	30
	x 2
Total	60%

7
8
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30

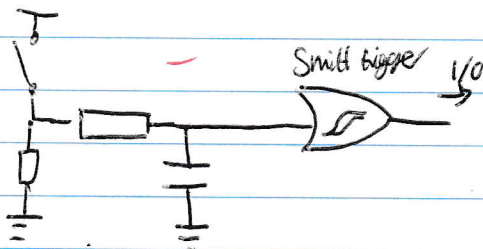
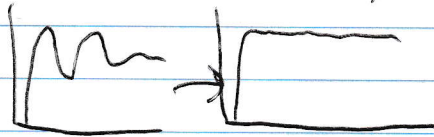
1)

- a) RETURN, Returns from a Subroutine, Returns to main code 1 1/2
- b) SLEEP, microcontroller in sleep mode, (IDLE) / waiting 1 1/2
- c) ADDLW, Add literal with w, Change literal address? by adding w value 2 2
- d) BCF, Bit clear F, clear bits of F variable 1 1
- e) DECF, decrement F, reduce value of F 1 1

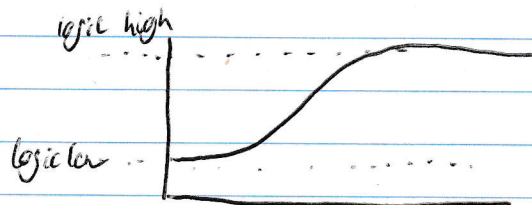
2)



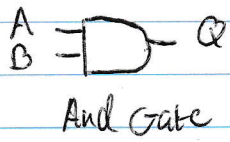
Using RC circuit to add a slight 'delay' to the switch & 'smooth' any fluctuations



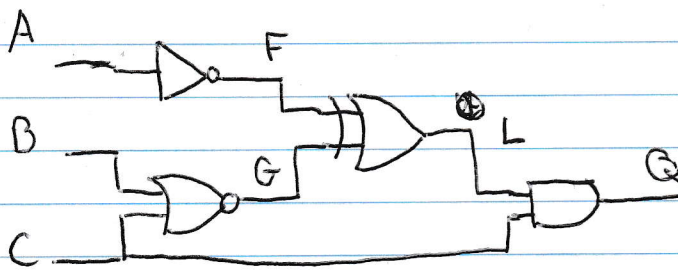
Adding a Schmitt trigger to the RC circuit add a hysteresis to the switch pulse to have a clean switch



3)



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

4)
a)

A	B	C	F	G	L	Q
0	0	0	1	1	0	0
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

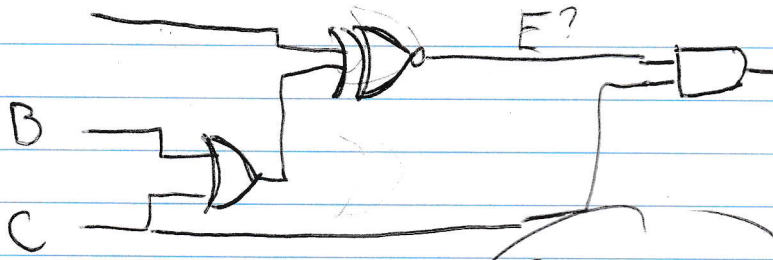
b) 1)

ABC	E	Q
000	1	0
001	1	0
010	1	0
011	1	0
100	0	0
101	0	0
110	0	0
111	0	0



ABC	Q
000	1
001	0
010	0
011	0
100	0
101	0
110	0
111	0

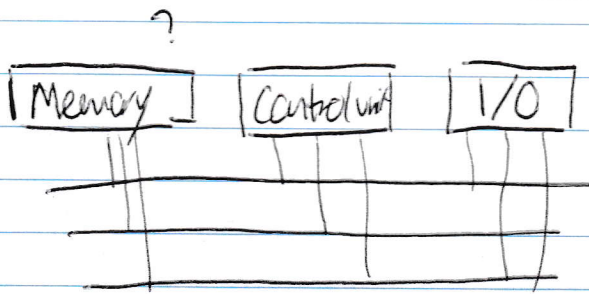
???



5)

Von Neuman

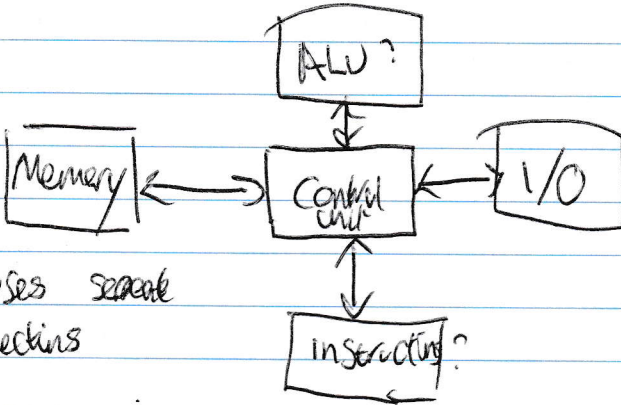
See Attempt After Q6



uses shared buses

Von Neuman
AC Architecture
is cheaper compared
to Harvard

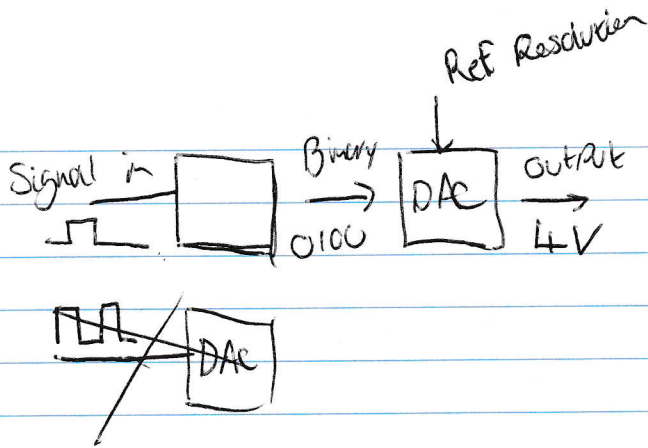
Harvard



uses separate connections

Harvard takes less (1)
clock cycles to
perform an instruction
compared to Von Neuman
which takes 2

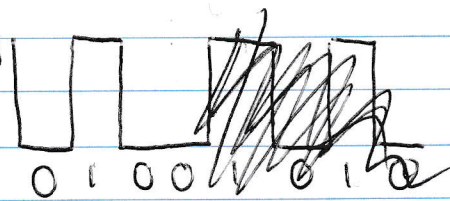
6)



??

The microcontroller pin outputs a PWM signal which is then interpreted and converted to relevant binary

The output voltage is increased per resolution to the corresponding binary value, for example



Binary Signal	V _{out}
0000	0v
0001	1v
0010	2v
0011	3v
0100	4v
ect...	ect

If the Signal was 0100 and the resolution was 1v the, Analogue value would be 4v

If Signal was 1010 the & the resolution was 1v, the output would be 10v

3b)

ABC	EFL	Q
000	101	0
001	101	1
010	101	0
011	101	1
100	000	0
101	000	0
110	000	0
111	000	0

