



Examination Answer Books

12 Pages

Complete, fold and seal
(see note 2 below)

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FORENAME(S): Emma

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	2317703
2	Title of Examination Paper	Micros, Peripherals & interfaces
3	Module Code	ACDA4004
4	Date and Time of Examination	8/1/25
5	Examination Venue	1Q301A
6	Seat Number	
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
1	6
2	8
3	3
4	7
5	8
6	1
	33
	+2
Total	66%

6
8
3
7
8
1

33

✓

1A) RETURN

Return to previous instructions

This is used inside subroutines that have been called using the CALL instruction and the return will return the program to the previous instruction location prior to the call.

B) SLEEP

Sleep state.

This can be used to put the program into a sleep state or standby mode where the program will use less resources and save power until an interrupt is used (this could be something like pressing a button to wake it up).

C) ADDLW

Add literal with W

This is used to add the literal value to the working register value and storing the new value into the W.

D) BCF f, b

Bit check f

This is to check the file variable state.

E) DECF

Decrease f

This will decrease the value of the variable stored in f.

2) To solve or reduce the incidence of switch bounce for the input of a typical PIC microcontroller IO pin you can add a resistor-capacitor (RC) adapter into the circuit. Diagram A (inside booklet) has been drawn to show how the RC adapter can be added into the circuit. Around the switch a capacitor and resistor would be added in series looping around the switch. Another way to solve this problem is to use a Schmitt adapter to adjust the switch bounce. Diagram B shows how the Schmitt inverter can be added into the circuit. This configuration also requires an additional resistor and capacitor, but they are put in parallel to each other with the Schmitt inverter placed in series.

3) Inside booklet

4A) Inside booklet

4B) Inside booklet

5) Diagrams for Von Neumann and Harvard processor architectures in booklet.

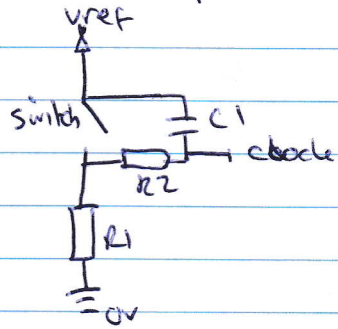
Von Neumann advantages: It is simpler and easier to implement alongside cheaper in cost as Harvard architecture requires additional components to implement.

Harvard advantages: It uses separate memory for data and instructions unlike Von Neumann and has separate buses for data and address, due to this Harvard is more efficient as it can run things in parallel unlike Von Neumann that suffers from bottleneck when transferring larger amounts of data.

6) Diagram for PWM digital signal in booklet.

2

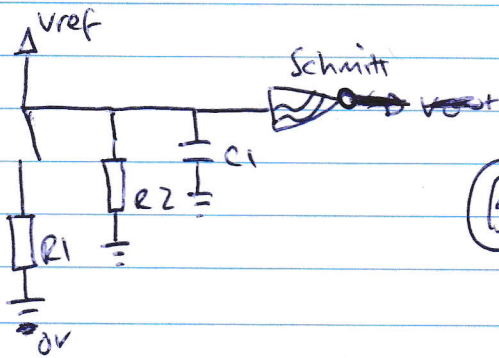
RC Adapter



(A)

4
4.

Schmitt



(B)

4

4
4.

3

AND

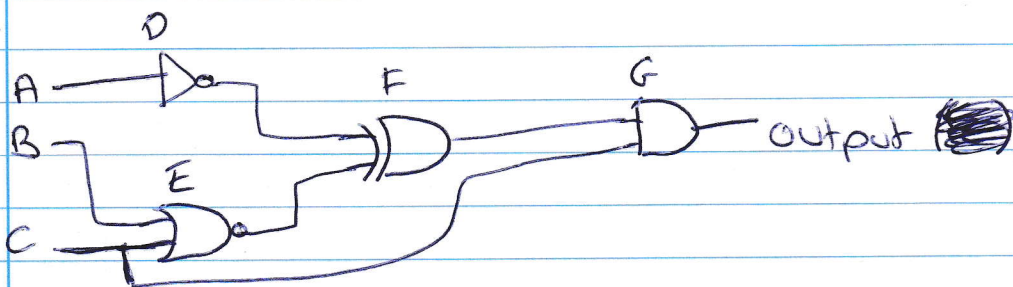
$$A \text{ AND } B = C$$

A	B	C
0	0	0
0	1	0
1	1	1
1	0	0

3

✓

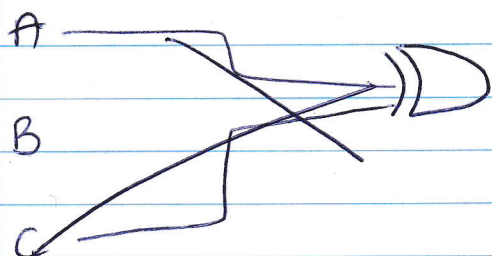
4A



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

~~2~~7
2

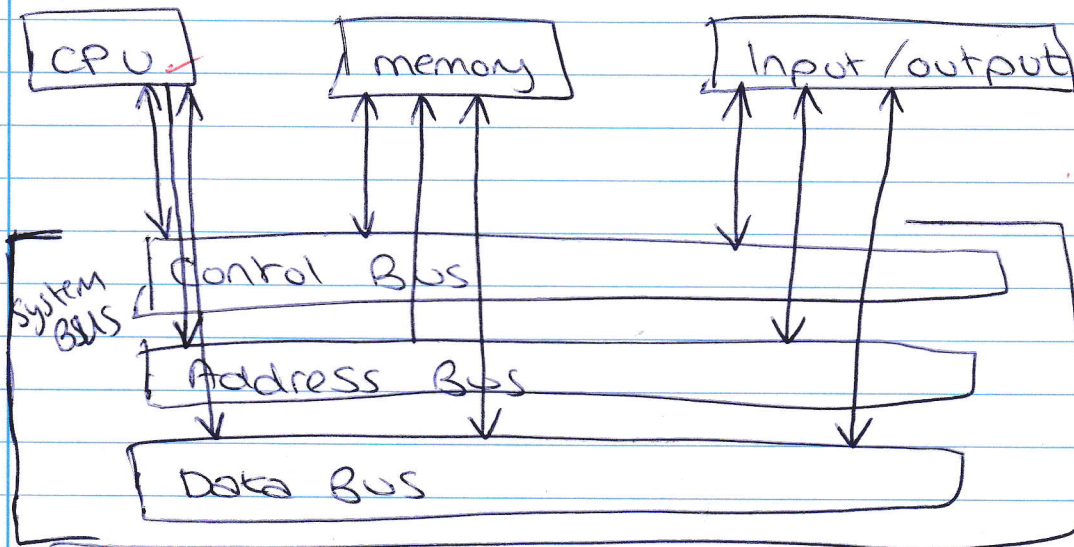
B



x

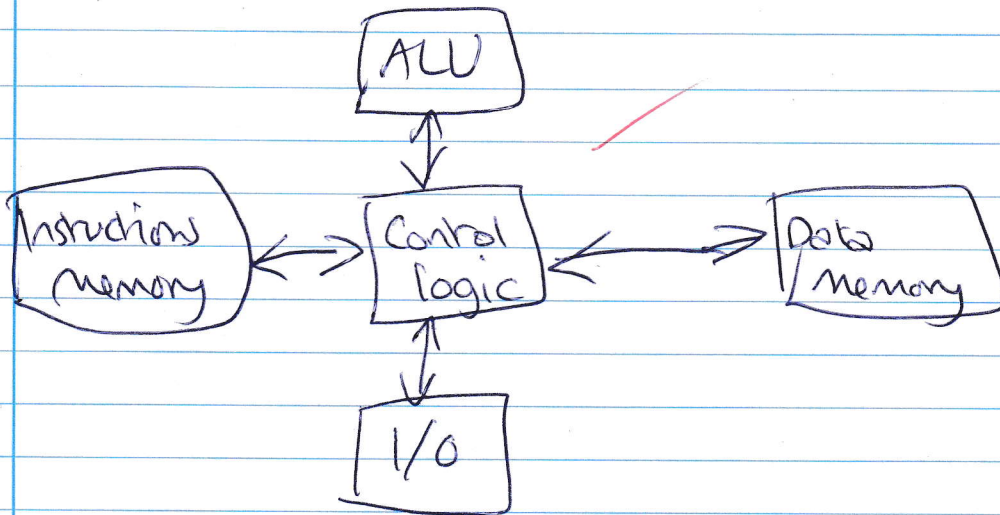
~~Answer~~

5 Non Neumann



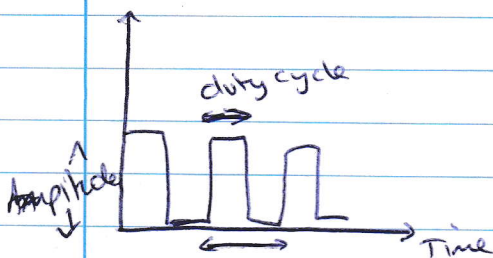
4
(+1)

Harvard



4
(+1)

6) PWM signal



8