



Prifysgol Cymru
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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).
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Complete, fold and seal
(see note 2 below)

SURNAME:

Ivey

FORENAME(S):

James

1	Student Number	IVE 20857781
2	Title of Examination Paper	Micros Peripherals and interfaces
3	Module Code	GOEE4000
4	Date and Time of Examination	17/05/24 PM
5	Examination Venue	Main hall Phon
6	Seat Number	D4
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
Q1	9
Q2	8
Q3	1.5
Q4	0.5
Q5	1.5
Total	20.5

(Gweler yr ochr arall am y fersiwn Cymraeg)

RK

20.5/50

41%

1.1.1 The control unit manages all processes, data and interrupts. ✓ (1)

Q1

9/15

1.1.2 Interrupts inside of a PIC processor can be label as two different types, internal and external. An internal interrupt is software based. An external interrupt is hardware based. X (0.5)

1.1.3 Memory hierarchy is a process of prioritising important data before others, therefore making the processor more efficient. (1)

1.1.4 DMA or Direct memory access is used to process important information quicker, through a different memory line. (1)

1.1.5 PWM or pulse-width mode, ✓ (1)

1.2 High-level programming, assembly language and machine language are all used to control computers or equipment. Human words and numbers mean nothing to them so we use this code to control and communicate. X (0.5)

1.3 RISC are used in single communication devices. CISC are used in double communication devices. X

1.4 The stack and queue are where all processes are sent. ~~The by getting the processor the less~~
Here all processes are finalised and applied.

1.5 Active "High" Tri-state buffer

In	Out	Impedance
0	0	Hi-Z
0	1	Hi-Z
1	0	0
1	1	1

(2)

Active "Low" Enabling Tri-state buffer

In	Out	Impedance
0	0	1
0	1	0
1	0	Hi-Z
1	1	Hi-Z

(2)

2. 1: Program memory is storage inside of this micro controller. This is a changeable memory. (1)

2: EEPROM, which stands for Electrically erasable programmable read only memory is a computer's BIOS. (1)

3: I/O ports are used for connections; This can include ethernet cables, a USB's and Power. These are used to connect to computers or projects ready to be coded. (1)

2. 4: V_{ref} is the voltage reference point for testing, this is called a testing point. It is placed next to the analog to digital converter to monitor the conversion works correctly. (1)

5: The A/D converter is to change any incoming analog signal to digital current, without this the controller would be ~~unstable~~. (0.5)

6: An oscillator is used to measure frequency inside of the microcontroller. (1)

7: The SPI and I²C. SPI is the Special peripheral interface which is used for communication. (1)

8: USART: Universal serial ~~serial~~

9: The CPU or central processing unit is the most important component of any microcontroller as it acts as the ~~human~~ brain, this controls all processes, inside of the board. (1)

10: WDT or called the watch/dog timer is used to wipe any interrupts. (0.5)

→ ? further explain.

3.1 I/O Start
I/O Stop
I/O Run
I/O Confirm
I/O Delete

~~XXXXXXXXXX~~

3.3a) The CPU will carry on with its current process and will then move on to the next interrupt. 0.5

Q3

1.5/10

Need further discuss about ISR

b) It is not a problem because these components are built to rectify problems and overcome them naturally. 1

c) If it cannot rectify the problem the microcontroller and CPU will not work. You can run error checks manually to fix these interrupts. X

4.1 Amdahl's Law is used to find overall efficiency inside of a computer system. 0.5

Q4

0.5/5

4.2. Amdahl's Law :
$$S = \frac{1}{f(k+1)}$$
 X

4.3 Option 1 for a processor array upgrade is better for efficiency X

5.1 USB stands for Universal Serial board. X

Q5

1.5/10

5.2 USB - A

USB - type C

USB - B

USB - V3

X

5.3 USB 1.0 = 48 X bytes/s

USB 2.0 = 512 X MB/s *800 MB/s per strand*

USB 3.0 = 5 GB/s ✓

USB 3.1 = 10 GB/s ✓

1

23

5/10

5.4 Step 1: The host system gets power charged 0.5

Step 2: The host system must determine whether the source is valid through drivers. X

Step 3: If the source is valid it can then connect. X

Step 4: If the source is not valid it will not connect. X

4

5/5

5

10