

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.**

Complete, fold and seal
(see note 2 below)

SURNAME: White

FORENAME(S): Pannic James
Henry

1	Student Number	WHI 15823148
2	Title of Examination Paper	HNC/HND in electrical and electronic engineering + micro peripherals + interfaces.
3	Module Code	GOEE 4000
4	Date and Time of Examination	17/5/24
5	Examination Venue	Main Hall
6	Seat Number	H 6
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
Q1	8
Q2	5.5
Q3	1
Q4	3
Q5	3
Total	20.5

(Gweler yr ochr arall am y fersiwn Cymraeg)

RR

$20.5 / 50$

✓

41%

✓

1.

1.1.1 Control unit is a part of the CPU which controls parts of the components within. ✓ (1)

1.1.2 Interrupts ~~is~~ alters the signals from the CPU ✓

1.1.3 ~~Memory hierarchy is a data transfer that uses the (FIFO) system~~ X

1.1.4 DMA stands for Direct Memory Access ✓ (1)

1.1.5 PWM stands for programmable width modulator and allows

#1

#2 memory hierarchy ~~is~~ uses an I/O at output and changes cycles within the processor.

2.

1. Program memory stores the data for further uses and different requests.

2. EEPROM is a programmable ROM that is able to be reset and reprogrammed ✓ (1)

3. an I/O port connects the microcontroller to the device allowing

4. V_{ref} is the stable voltage reference. ✓ (1)

5. A/D converter is the analog to converts the ~~signal~~ ^{output} from analog to digital ~~signals~~ output. ✓ (0.5)

6. Oscillator is used to synchronise the communication signals ~~received~~ ^{received}. ✓ (1)

Q1

8/15

Q2

5.5/10

7. the SPI ~~is~~ is used ~~to~~ ~~stabilise~~ any communication
8. USART is used to stabilise the different communications received. X
9. the CPU is the main component within the microcontroller and gives the instructions to the rest of the board. ✓ (1)
10. The WDT stands for watch dog timer and improves the reliability due to it ~~be~~ being able to reset ~~and~~ and fix any problems. (1)

* (1)

1.2 It is easier to read/write and there is a use of Mnemonic rather than ~~binary~~ used. X

1.3 CISC RISC are
 • long transfers X
 • transfersⁿ the ~~same~~ size

CISC is used for more complex transfers X whilst RISC is used for simpler and smaller ~~transfers~~.

1.4 Stack is a data transfer that uses the 'LIFO' system which stands for last in, first out, (1)

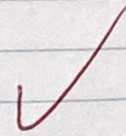
Queue is a data transfer that uses the 'FIFO' system which stands for First in First out. (1)

Question No.

1.5.

Active High

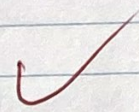
Enable	in	out
0	0	Hi-Z
0	1	Hi-Z
1	0	0
1	1	1



(2)

Active low 'inverting'

Enable	in	out
0	0	1
0	1	0
1	0	Hi-Z
1	1	Hi-Z



(2)

(3)

3.1

X

Q3

1/10

3.2

SPI uses full duplex whilst the I²C interface only uses half duplex (1)

3.3

- a) the new interrupt will wait until the first request is completed. X
- b) It is a problem because it will take longer to process requests. X

Q4

3/5

4)

4.1

X

4.2

$$S = \frac{1}{(1-f) + \frac{f}{K}}$$

✓

①

S = Speed

f = Working time

K = overall

4.3.

$$S = \frac{1}{(1-f) + \frac{f}{K}}$$

$$1. \quad S = \frac{1}{(1-0.7) + \frac{0.7}{1.5}} = 1.3 \quad \checkmark \quad \textcircled{1}$$

$$2. \quad S = \frac{1}{(1-0.3) + \frac{0.3}{2.5}} = 1.2 \quad \checkmark$$

miss a step

~~option 2 is better~~ Upgrading your
Disk drive would be better.

✓ ①

5.

Q5

5.1 USB stands for Universal serial Bus. ✓ ①

3/10

5.2 USB, USB-C, USB-U, ~~USB-A~~. USB-micro X

5.3 USB 1.0 = 12 M-Bits

USB 2.0 = 480 M-Bits ✓

USB 3.0 = 5 G-Bits

USB 3.1 = 10 G-Bits

②

- 5.4
1. Receive signal through electronic
 2. Acknowledge the signal
 3. handling
 4. Service routine
 5. Return back ~~to~~ to say system is OK.
- X
- field X

~~field~~
~~field~~
~~field~~
~~field~~
~~field~~