



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.
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1	Student Number	2312801
2	Title of Examination Paper	Computer architecture
3	Module Code	ACCA4022
4	Date and Time of Examination	12/5/25 9:00
5	Examination Venue	1Q310
6	Seat Number	44
7	Number of Answer Books handed in	

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)

1 62.

a) ~~32~~ ~~16~~ ~~8~~ ~~4~~ ~~2~~ ~~1~~ 32 | 16 | 8 | 4 | 2 | 1
 Decimal 62 = Binary 111110

125

64 | 32 | 16 | 8 | 4 | 2 | 1
 1 1 1 1 1 0 1

Decimal 125 = Binary 1111101

b)

b)

i) 10011001 128/64/32/16/8/4/2/1
 1 0 0 1 1 0 0 1
 $128 + 16 + 8 + 1 = 153$

ii) 11110 16/8/4/2/1
 1 1 1 1 0

16

8

4

+ 2

30

"

= 30

c)

i) 2 F 2 | F (15) 9 = 9
 2' 15 8/4/2/1 | 8/4/2/1 10 = A
 0 0 1 0 | 1 1 1 1 11 = B
 12 = C
 13 = D
 14 = E
 15 = F

2F = 0010 1111

ii) 36 = 0011 0110

3 | 6
 8/4/2/1 | 8/4/2/1
 0 0 1 1 | 0 1 1 0

1
D)

$9 = 9$

$10 = A$

$11 = B$

$12 = C$

$\frac{12}{2} = 6$

$\frac{6}{2} = 3$

i) $C3 = 12 | 3$

12

3

$8/4/2/1 | 8/4/2/1$

$1 | 1 | 0 | 0 | 0 | 0 | 1 | 1$

$128/64/32/16/8/4/2/1$

$1 | 1 | 0 | 0 | 0 | 0 | 1 | 1$

128

64

2

$+ 128$

140

5

1

$C3 = 191$

ii) $66 = 6 | 6$

$8/4/2/1 | 8/4/2/1 | 128/64/32/16/8/4/2/1$

$0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0$

64

32

4

$+ 2$

102

11

$66 = 102 \text{ Decimal.}$

e) $00000 = 32$

$1 | 1 | 1 | 1 | 1$

F) i) 4000×3000

$4 \times 3 = 12$

$40 \times 30 = 1200$

$400 \times 300 = 120000$

$4000 \times 3000 = 1,200,000$

$= 1.2 \text{ Megapixels}$

ii) $36 \text{ Mb @ Compression of } 10:1$

$= 3.6 \text{ Mb}$

$(3.6 \times 10 = 36 \text{ Mb})$

$\uparrow$

$B!$

1.

g)

 $36 \text{ MB @ } 80 \text{ Mbps} = \sim 0.6 \text{ seconds.}$

2.

- i.) CPU - Central processing unit. This is the brain of the Computer. It is responsible for telling each Component what to do whilst also Processing any information that passes through. ✓ 2 2

Memory - Ram - The Memory's job is to act as an intermediary between the CPU and the Systems Storage. For example, When playing a game, the game's essential data will be copied to the Ram as it is able to be accessed quicker than if it were to be on just the Storage device. Once the data is no longer immediately required, it is moved back to the Mass Storage. 1 1

Input + Output - (i/o) - These are typically your HiD devices, ^{like a} Keyboard, mouse ^{and also} Speakers, Monitors etc. They (input wise) allow the Computer/device to be controlled and/or add data to the system. eg. ~~Output (Speakers)~~ mouse, Keyboard, external HDD, Web Cam. For output, this will typically allow the Computer/Device to display an output to a task it's been given (such as playing music out of some Speakers). 2 2

Control bus - This is a high speed link whose main purpose is to control what each component does and for example, how much power it wants. ? x

^{Data} ~~Control~~ bus - This too is a high speed link whose main purpose is to recall and replace data from the Mass Storage as and when it is needed. 1 1

Address bus - Similarly, this is also a high speed link however the address bus is responsible for assigning ✓

~~2.1~~ 2.1) a location for all incoming data to be stored.
2.1.1)

22

2)

A. ii.

For example, if someone were to create a Word document the operating principle would look like this.

First, a keyboard stroke would pass through the I/O and head toward the Data bus. ~~Here~~ Here, the data bus will see the new input and understand what value it has just been given. Next, the address bus will assign it an address. For this, it will be our memory (RAM) however, before it makes it there it will pass through the control bus. This will tell the memory how it should be stored and also tell the I/O monitor to display a new value.

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3a

- i. 4GB
- ii. 2TB
- iii. 1TB

2 2

2 2

b.

- i. 5000 Mbps
- ii. 200 Mbps
- iii. 1Gbps

1 1

1 1

2 2

c.

- i. Raid 0 Would allow for the computer to see the 2 3TB HDD's as 1.6TB HDD. While it lacks redundancy in this configuration, it improves the read/write speeds and makes the system easier to use than if it had 2 separate locations.

4 4

- ii Raid 1 Would still utilize both 3TB HDD's however the available storage would only be 3TB. This is because Raid 1 ~~only~~ basically duplicates the data onto both drives so that in the event of a failure, there is always a redundant copy with the data intact.

4 4

Ci. Pros:

Allows for a higher read/write speed.

Makes accessing the storage simpler.

Cons:

No redundancy in the event of a failure.

Cii) Pros:

Always has an ~~by~~ exact back up of all data.

Cons: ~~EA~~

Use half your storage to the backup.

Can result in slower read/write.

4.

a) For a 4K editing Work Station I would recommend an Intel i7-13700. This is because it has a brilliant multi-core power and benefits from a price decrease due to it being from the generation before the latest. But also does not suffer from the issues that the 14th gen are currently experiencing.

b) 32 gb of RAM would seem appropriate to me as 4K footage can be quite large especially when editing and especially when rendering the final product after the editing is finalised.

c) I would personally aim for at least 2TB of M.2 NVME storage as you would want to access them large files quickly and easily which an HDD wouldn't be able to provide.

d) I would advise that the user must have at least a 10Gb ethernet card for quick access to a NAS where all of the project files could be stored. Not to mention plenty of USB ports for connecting devices such as a mouse, keyboard, audio midi. I'd also aim for at least 2 display port outputs so that the system can run dual monitors.

e) 4K editing can be quite intense and can require a lot of graphical power. I would recommend a used Nvidia RTX 3080. These have come down in price recently and are still incredibly capable compared to 40 gen.

4F.

Typical Software for Video editing include;
Adobe Premiere Pro, Davinci Resolve ~~12~~, Final Cut Pro.

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