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MARKSCHEME

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COMPUTER SCIENCE

Standard Level

Paper 1

11 pages

SECTION A

1. (a) To translate HLL programs (into executable code) ***[1 mark]***.

(b) *Award **[1 mark]** for a valid difference and **[1 mark]** for an elaboration:*

A compiler stores the final executable code, whereas an interpreter does not store code after executing it;

A compiler requires a complete section of HLL code, whereas an interpreter only requires parts.

2. General answers such as better, faster, cheaper are not acceptable unless the reason elaborates correctly.

*Award **[1 mark]** for correct reason and **[1 mark]** for a correct elaboration:*

e.*g.* Dirt ***[1 mark]*** would stop OCR, but not MICR ***[1 mark]***
Fraud ***[1 mark]*** because it is more difficult to forge MICR ***[1 mark]***

3. 16 × 1024 × 8 = 131 072 bits per second ***[2 marks]***
(*Award both marks if left as 16 × 1024 × 8*)
Award 1 mark for 16 × 1000 × 8 = 128 000 bps

If only 16 × 1024 is done, give ***[1 mark]***. No marks for only 16000 bps.

4. *Award **[2 marks]** for each advantage, **[1 mark]*** each for the advantage and ***[1 mark]*** for each outline *up to **[2 marks]** maximum:*

Advantage must relate to shared database.
Many people can access the data / from many locations ***[1 mark]***.
Data is more likely to maintain integrity than when using separate copies ***[1 mark]***.

5. *Award **[1 mark]** for the following answer:*

Parallel

6. *Award **[1 mark]** for each error, and **[1 mark]** for a correct example for each error to give a maximum of **[6 marks]**.*

Syntax error ***[1 mark]***, any example, misspelling a reserved word *etc.* ***[1 mark]***

Logic error ***[1 mark]***, any calculation error, use of wrong file *etc.* ***[1 mark]***.

Run-time error ***[1 mark]***, *e.g.* division by zero, no file *etc.* ***[1 mark]***.

7. *Award **[1 mark]*** for each correct secondary memory up to a maximum of ***[2 marks]***

Magnetic disk ***[1 mark]***
Optical disk / CD-ROM ***[1 mark]*** (Do NOT accept just ROM)
Magnetic tape ***[1 mark]***
Accept 'disk and tape' for ***[2 marks]***
ZIP-drive (even though this is the device and not the medium)

8. *Award **[1 mark]** for a correct fact about **each**, and **[1 mark]** for a correct example of use of each, up to **[4 marks]** max.*

Batch processing does not process data immediately, but waits until a group of data has been collected ***[1 mark]*** whereas on-line processing is interactive ***[1 mark]***. *e.g.* of batch processing is payroll / utility billing ***[1 mark]*** an example of on-line is air-traffic control / supermarket tills *etc.* ***[1 mark]***. *If an example is given which only 'could' be on-line then further elaboration is needed.*

9. (a) *Award **[2 marks]** max for a description. Award the marks if a candidate has described verification, the types of error, described a validation technique and identified a situation even if they have related their answer to data transmission.*

Double-entry of data ***[1 mark]*** both versions compared by software ***[1 mark]*** and differences highlighted ***[1 mark]***.

*Award **[1 mark]** for the error type:*

Any mistyping / misreading of input data by keyboard entry.

(b) *Award **[2 marks]** max for a description and **[1 mark]** for an application.*

Range check ***[1 mark]*** to test if input data is in pre-set limits ***[1 mark]***. Entering percentages in an examination ***[1 mark]***.

Type check ***[1 mark]*** to test if input data is correct data type ***[1 mark]***. Test if percentage is an integer *etc.* ***[1 mark]***.

SECTION B

10. (a) *Award marks as follows:*

POS	DATA[POS]=1	COUNT	CHECK	***Marks***
		0		[given]
1	false	0		[given]
2	true	1		[given]
3	true	2		***[1 mark]*** for increment
4	true	3		
5	false	3		***[1 mark]*** for not incrementing
6	true	4		
7	true	5		***[1 mark]*** for final answer of 5
8	false	5	false	***[1 mark]*** for returning false

(b) *Award **[1 mark]** for:*

true.

(c) *Award **[2 marks]** for stating:*

even parity;
If just 'parity' is stated, give ***[1 mark]***.

(d) *Award **[1 mark]** for:*

the idea of communications / transmission / WAN.

(e) *Award **[2 marks]** for a complete answer. e.g.:*

If two bits are changed, then no error is detected.

It can detect an odd number of bits change, but cannot correct it.

It cannot correct the error because the location is not known.

*Award **[1 mark]** for a partial answer. e.g.*
'not all errors are detected', 'cannot correct errors'.

11. (a) *Award **[1 mark]** for the following:*

Star

(b) *Award marks as below, up to a maximum of **[3 marks].***

If corrupted whilst being written without a copy ***[1 mark]***, then all the data would be lost ***[1 mark]***. If a copy is made, only the copy is lost ***[1 mark]*** (keeping the original). If the user makes a mistake ***[1 mark]*** then the copy can be used ***[1 mark]*** to go back to the previous version ***[1 mark]***.

(c) *Award **[1 mark]** for each valid criterion to judge the new system, up to a maximum of **[2 marks]***

Compare the time taken to complete a task ***[1 mark]***.
Compare the number of mistakes made ***[1 mark]***.
Compare the ease-of-use of system ***[1 mark]***.
(Accept answers along the line of 'takes less time' *etc.)*

(d) *Award **[1 mark]** for each device (one input and one output) and **[1 mark]** for a valid purpose of each up to **[4 marks]**. Allow general devices such as mouse, keyboard etc.*

(i) Graphics tablet / light pen ***[1 mark]***
(ii) to enter a design in drawing / freehand format ***[1 mark]***.

(i) Plotter ***[1 mark]***
(ii) to see design before completion ***[1 mark]***.

(i) Printer ***[1 mark]***
(ii) for warehouse staff to read off list of parts required ***[1 mark]***.

12. (a) *Award marks as follows, up to **[3 marks]***:

The original song is in analog form ***[1 mark]*** and a computer works in digital form ***[1 mark]***, so it needs to be converted for storage ***[1 mark]***.

(b) *Award **[1 mark]** for each idea and **[1 mark]** for an elaboration, up to **[4 marks]** max. If the reason worked and the 'explaining' is correct then award the mark.*

Compression ***[1 mark]*** so that less data is sent, so it is faster ***[1 mark]***.

Faster connection ***[1 mark]*** so that more bits per second are sent ***[1 mark]***.

(c) *Award marks as follows, up to **[3 marks]** max:*

HTML is used to avoid protocol problems ***[1 mark]*** and so can be used by different software / machines ***[1 mark]***. It is in a standard format ***[1 mark]***. Separate files are used so that smaller files download faster (*e.g.* text) ***[1 mark]*** so that the user sees information 'gradually' appear (rather than waiting at a totally blank screen) ***[1 mark].*** The format of different data is different (*e.g.* sound/graphics) ***[1 mark]*** so need separate files ***[1 mark].***

Allow marks for answers relating to the fact that not all files have to be transmitted.

13. (a) *Award **[1 mark]** for a definition, and up to **[2 marks]** for a clear outline to give a maximum of **[3 marks]**.*

Encryption is the 'scrambling' / 'secret coding' of data ***[1 mark]*** do **not** accept 'coding' on its own.

It is done for security ***[1 mark]*** so that if data is intercepted / stolen ***[1 mark]*** it appears to be nonsense / unreadable ***[1 mark]***.

(b) To increase security ***[1 mark]*** so if one part of the data is intercepted / stolen, it is unlikely that the other part will be as well ***[1 mark]***.

(c) *Award **[1 mark]** for each of the following points up to a maximum of **[4 marks]**.*

- At sending computer algorithm is applied to data ***[1 mark]***
- Data is spilt into two parts ***[NO marks]***
- Transmission / comms software sends it to receiving computer ***[1 mark]*** (***[NO marks]*** just for 'data is sent')
- A modem is used to convert signals to telephone signals ***[1 mark]***
- At receiving computer data is reassembled (into one part) ***[1 mark]***
- Decryption algorithm is applied ***[1 mark]***
- **New** encryption algorithm is applied ***[1 mark]***
- Data is split into two parts ***[NO marks]***
- Transmission / comms software sends it to original computer
- A modem is used to convert signals to telephone signals
- At receiving computer data is reassembled (into one part)
- Decryption algorithm is applied (***[NO marks]*** if already gained first time).

*The final mark(s) must be from the following to give an overall section maximum of **[5 marks].***

- Message is compared with original ***[1 mark]***
- If it is not the same, retransmit ***[1 mark]***