Oxford Cambridge and RSA

Accredited

…day … Month Year – Morning/Afternoon

GCSE (9–1) Computer Science

J277/01 Computer systems

Time allowed: 1 hour 30 minutes

Sample Question paper

Do not use:
- a calculator

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink.
- Write your answer to each question in the space provided.
- Answer **all** the questions.

INFORMATION
- The total mark for this paper is **80**.
- The marks for each question are shown in brackets **[ ]**.
- Quality of written communication will be assessed in this paper in questions marked with an asterisk (*).
- This document has **12** pages.

ADVICE
- Read each question carefully before you start to answer.

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Answer **all** the questions.

1 The specification of two CPUs is shown in **Fig. 1**.

Computer 1	Computer 2
Clock Speed: 1 GHz	Clock Speed: 1.4 GHz
Cache size: 2 MB	Cache size: 2 MB
Number of Cores: 4	Number of Cores: 2

Fig. 1

(a) When running a 3D flight simulator, Computer 1 is likely to run faster than Computer 2.

Using the information in **Fig. 1**, identify **one** reason for this.

……..

…… **[1]**

(b) Identify **two** other parts of a computer that are not in **Fig. 1**, which could improve the performance of the computers.

1 ……

2 ……

[2]

(c) Explain **one** reason why the cache size affects the performance of the CPU.

……

……

……

…… **[2]**

(d) Identify **two** events that take place during the fetch-execute cycle.

1 ……

……

2 ……

……

[2]

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2 Nina wants to transfer photos from a digital camera to an external secondary storage device.

(a) Define what is meant by 'secondary storage'.

……

…… **[1]**

(b) Identify the **three** common types of storage Nina can choose from.

1 ……

2 ……

3 ……

[3]

(c) State **four** characteristics of secondary storage devices that Nina should consider when choosing a device.

1 ……

2 ……

3 ……

4 ……

[4]

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3 A satellite navigation system (Sat Nav) uses RAM and ROM.

(a) Tick (✓) **one** box in each row to show whether each of the statements is **true** for the RAM or ROM in a Sat Nav.

	RAM	**ROM**
Stores the boot up sequence of the Sat Nav.		
The contents are lost when the Sat Nav is turned off.		
Holds copies of open maps and routes.		

[3]

(b) The Sat Nav contains an embedded system. Define what is meant by an 'embedded system'.

……

…… **[1]**

(c) Identify **three** devices, other than a Sat Nav, which contain embedded systems.

1 ……

2 ……

3 ……

[3]

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4 A computer records an audio file of someone playing a guitar.

(a) Describe what happens when the computer converts the music into a file.

……

……

……

…… **[2]**

(b) The sample rate is increased on the computer when recording the guitar.

Give **two** effects this will have on the recording.

1 ……

……

2 ……

……

[2]

5 **(a)** Convert the binary number 11001011 into denary.

……

…… **[1]**

(b) Complete a 2-place shift to the right on the binary number 11001011.

……

…… **[1]**

(c) Explain the effect of performing a 2-place shift to the right on the binary number 11001011.

……

……

……

…… **[2]**

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6 The table gives the ASCII code for the characters.

Character	ASCII code
L	76
M	77
N	78
O	79
P	80

Explain how the word MOP will be represented in ASCII**.**

……

……

……

…… **[2]**

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7 The owners of a large bakery have a Local Area Network (LAN) with a star topology. They order their supplies over the Internet. When data is transmitted from the bakery to the supplier, network protocols are used.

(a) Define what is meant by a 'network protocol'.

……..

……..… **[1]**

(b) TCP/IP is a set of protocols based on layers.

(i) With regards to network protocols, define what is meant by a 'layer'.

……

…….. **[1]**

(ii) Describe **one** advantage of using layers to construct network protocols.

……

……

……

…….. **[2]**

(c) Give **two** reasons why the bakery may use a star network topology for their LAN.

1 ……..

……

2 ……..

……

[2]

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8 A hospital stores patients' details on its computer network. The hospital is concerned about the security of its patients' details.

(a) Staff already use strong passwords to protect systems. Explain, with reference to system security, **three** other ways that the hospital could protect the network system.

1 ……

……

……

……

2 ……

……

……

……

3 ……

……

……

……

[6]

(b) Identify **three** errors that the hospital staff could make that may endanger the security of the network. Outline a procedure that could be put in place to prevent each error.

Error 1 ……

Procedure 1 ……

……

Error 2 ……

Procedure 2 ……

……

Error 3 ……

Procedure 3 ……

……

[6]

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9 A restaurant has a computer-based ordering system which is running slowly. A technician has said that the hard disc drive is fragmented. The technician has suggested using utility software to defragment the drive.

(a) Explain how the restaurant's hard disc could have become fragmented.

……...

……...

……...

……...

……...

……...

……...

…… **[4]**

(b) Explain how defragmentation software could overcome the issue of the slow computer system.

……...

……...

……...

……...

……...

…… **[3]**

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10 A law company currently use a Local Area Network (LAN) linked to a Wide Area Network (WAN). They want to upgrade their system to utilise cloud storage.

(a) Define what is meant by a Wide Area Network.

…… **[1]**

(b) Explain **two** advantages to the law company of storing their data in the Cloud.

1 ……

……

……

……

2 ……

……

……

……

[4]

(c) Explain **two** disadvantages to the law company of storing their data in the Cloud.

1 ……

……

……

……

2 ……

……

……

……

[4]

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(d) **Fig. 2** lists some actions that may take place in the law company's office. Tick (✓) **one** box in each row to show which legislation applies to each action.

Action	Data Protection Act 2018	Computer Misuse Act 1990	Copyright Designs and Patents Act 1988
Using a picture for the law company's new logo without the original creator's permission.			
A secretary accessing a lawyer's personal email account without permission.			
Making a copy of the latest Hollywood blockbuster movie and sharing it with a client.			
Storing customer data insecurely.			
A lawyer installing a key logger on the secretary's computer.			
Selling client's personal legal data to a marketing company without their permission.			

Fig. 2

[6]

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11 * People often want to buy the most up-to-date smartphones, even though the smartphone they own still works.

Discuss the impact of people wanting to upgrade to the latest smartphone.

In your answer, you might consider the impact on:

- smartphone users
- cultural issues
- ethical issues
- environmental issues.

……

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…… **[8]**

END OF QUESTION PAPER

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