

GCSE OCR Computer Science

Practice Set A Paper 1 Computer Systems

Centre name				
Centre number				
Candidate number				

Time allowed:

- 1 hour 30 minutes

You **may not** use a calculator

Surname
Other names
Candidate signature

Instructions to candidates

- Write your name and other details in the spaces provided above.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information for candidates

- There are 80 marks available on this paper.
- The marks available are given in brackets at the end of each question.
- Quality of extended responses will be assessed in this paper in questions marked with an asterisk (*).

For examiner's use							
Q	Attempt N ^o			Q	Attempt N ^o		
1				5			
2				6			
3				7			
4				8			
Total							

1. Fergus owns a desktop computer with a 2.2 GHz quad-core CPU. He uses it to play video games and edit photographs that he takes with his digital camera.

(a) State the purpose of the CPU in a computer system.

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[1 mark]

(b) Fergus' CPU uses Von Neumann architecture and features various registers. One of these registers is the MAR (Memory Address Register). State **one** other register used in Von Neumann architecture and the purpose of the register.

Register

Purpose

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[2 marks]

(c) Fergus decides to purchase a new CPU with a higher clock speed compared to the one he currently owns. Explain, with reference to how Fergus uses his computer, the effect this will have on the computer's performance.

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[2 marks]

(d) Fergus' computer has 8 GB of RAM. State the purpose of RAM in a computer.

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[1 mark]

(e) Explain what is meant by 'virtual memory' and why it may be needed by a computer system.

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[2 marks]

(f) Fergus's digital camera is an example of an 'embedded system'.

(i) Define the term 'embedded system'.

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.....

[1 mark]

(ii) Other than digital cameras, give **three** examples of embedded systems.

1
2
3

[3 marks]

2. Freya is the network manager for CeraOTS, a large multi-national firm that publishes magazines in various languages. CeraOTS has offices in multiple countries, and these offices are connected to each other via a 'Wide Area Network' (WAN).

(a) Define the term 'Wide Area Network'.

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[1 mark]

(b) Each CeraOTS office has its own LAN. Identify **one** piece of network hardware required to create a LAN and explain why this piece of hardware is needed.

Hardware required

Explanation

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[2 marks]

(c) CeraOTS uses a client-server network setup. Describe, with an example, the relationship between client and server on the CeraOTS network.

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.....

[2 marks]

Turn over ►

- (d) Freya discovers that the Wi-Fi® signal is poor in some areas of her office. Suggest **two** possible causes of the poor Wi-Fi® signal.

1
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2
.....
[2 marks]

3. Mr Whorton is a teacher in a secondary school. He is considering storing student exam results using a cloud storage system.

- (a) Discuss the potential ethical and legal issues of Mr Whorton using the cloud to store students' data.

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[4 marks]

- (b) The secondary school uses both open source and proprietary software on its computer systems. State **two** differences between open source and proprietary software.

1
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2
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[2 marks]

- (c) Mr Whorton learns that the school has been the victim of a cyber-attack. State the name of the law which is designed to prosecute hackers who gain access to computer systems without consent.

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[1 mark]

4. Margaret owns a laptop computer which she occasionally uses to work from home. The laptop computer uses secondary storage.

(a) Define the term 'secondary storage'.

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..... [1 mark]

(b) Explain why Margaret's laptop computer needs secondary storage.

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..... [2 marks]

(c) Margaret's laptop computer has a Solid State Drive (SSD). Describe **one** benefit of having a SSD, rather than a Hard Disk Drive (HDD), in her laptop computer.

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..... [2 marks]

(d) Margaret wants to transfer some large files from her work computer to her home laptop. Suggest **one** storage technology Margaret could use to transfer these files and explain why this is a suitable technology to use.

Storage technology

Explanation

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..... [3 marks]

Turn over ►

5. Dinesh is a cyber-security expert who has been employed by a large bank, XiBank, to discover potential vulnerabilities in their computer systems. XiBank are particularly worried about being attacked by 'social engineering'.

(a) (i) Define the term 'social engineering'.

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[1 mark]

(ii) Describe **two** examples of how XiBank could be attacked using social engineering.

1
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2
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[4 marks]

(b) Dinesh is concerned that XiBank's system is vulnerable to a 'denial of service' attack.

(i) Give the definition of a 'denial of service' attack.

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.....
[1 mark]

(ii) Identify **one** possible effect on XiBank of a denial of service attack.

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.....
[1 mark]

- (c) State **three** security measures that Dinesh could put in place to increase the general security of XiBank's network.

1

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2

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3

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[3 marks]

6. Francesca works as a software engineer for Grenoside Software and is currently helping to develop a new Operating System (OS).

- (a) State **two** functions of the Operating System in a computer system.

1

2

[2 marks]

- (b) Francesca intends to include 'utility software' as part of the OS. State what is meant by 'utility software', and give **two** examples of it.

Definition

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Examples 1

2

[3 marks]

- (c) The new OS will feature a 'multi-tasking' function. Describe what is meant by 'multi-tasking', with reference to both the user and the CPU.

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[2 marks]

Turn over ►

- (d) Grenoside Software makes a full backup of the contents of their computer systems every Monday, and an incremental backup every two days.

- (i) Explain the difference between full and incremental backups.

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[2 marks]

- (ii) Explain how Grenoside Software could restore their data if they experienced a corrupted hard disk on a Saturday.

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[3 marks]

7. * Artificial Intelligence (AI) is becoming part of many people's day-to-day lives.

Examples include:

- the increased use of computers giving medical advice.
- website help assistants that respond to typed or spoken questions, imitating a conversation with a real person.
- social media websites that scan profiles to provide targeted adverts and information.

Discuss the impact of the increasing use of Artificial Intelligence (AI) in society.

In your answer, you might consider:

- cultural implications
- technology
- ethical implications
- environmental issues

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[illegible]

Turn over ►

8. Arthur has a media server in his home, that he connects to with various devices over a LAN. His network uses a star network topology with a 'home hub' that combines the functions of a router, switch and wireless access point.

(a) State what is meant by the term 'network topology'.

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[1 mark]

(b) Arthur has a desktop computer and a 'smart' TV connected to the network via wired connections, and his smartphone and his speakers both connect wirelessly. Draw a labelled diagram of the topology of Arthur's network.

[3 marks]

(c) While checking some settings on the media server, Arthur sees that each device connected to the server has a MAC address. State the purpose of a MAC address.

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[1 mark]

- (d) Arthur's network is connected to the Internet via his 'home hub'.
Network protocols are used during Internet communications.

The table below lists operations carried out by different network protocols.
Match the correct protocol to the corresponding operation.

Operation
Sending or retrieving files from a remote server or computer
Downloading an email and deleting it from the sever
Transferring emails between remote servers
Accessing and retrieving web pages

Protocol
POP (Post Office Protocol)
SMTP (Simple Mail Transfer Protocol)
HTTP (Hyper Text Transfer Protocol)
FTP (File Transfer Protocol)

[4 marks]

- (e) The TCP/IP stack uses 'layers' during the transfer of data.
State what is meant by the term 'layer' in this context.

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[1 mark]

Turn over ►

- (f) Arthur attempts to save a file to the server. The server has a system in place to ensure that all files saved to it have valid filenames.

When a user wants to save a file to the server, a prompt asks them to enter a filename. If a file with this name already exists, or if the filename is over 30 characters long, then it will respond with a prompt stating the type of error and asking the user to rename the file. Once a valid name is chosen, the file is saved to the server and a confirmation message, which includes the final filename, is displayed to the user.

Write an algorithm to demonstrate the process of saving a file to the server.

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[6 marks]

END OF QUESTIONS