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COMPUTER SCIENCE

0478/13

Paper 1 Computer Systems

May/June 2026

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **16** pages. Any blank pages are indicated.

1 A computer has primary and secondary storage.

(a) Tick (✓) **one** box to show which is an example of primary storage.

A cloud storage

☐

B firmware

☐

C read only memory (ROM)

☐

D solid-state drive (SSD)

☐

[1]

(b) Solid-state is a type of storage. An SSD is one example of solid-state storage.

(i) Identify **two** other examples of solid-state storage.

1

2 [2]

(ii) Give **two** other types of storage.

1

2 [2]

(c) The computer uses the ASCII character set for a text file.

One word from the text file is 'cat'. The ASCII denary value for the character 'c' is 99.

(i) Give the ASCII denary values for 'a' and 't'.

a

t [2]

(ii) Identify **one** other character set that the computer could use.

..... [1]



(iii) The text file needs to be compressed.

Identify the most appropriate type of compression for the text file. Justify your choice.

compression type

justification

.....

.....

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.....

.....

[4]



2 Data is transmitted across a network.

- (a) The bits of data are divided into sections that are each transmitted independently across the network to their destination.

Identify the name given to these sections of data.

..... [1]

- (b) A network component is used to control the path taken across the network for each section of data.

Identify the name of this network component.

..... [1]

- (c) Data is transmitted across the network using the serial full-duplex data transmission method.

Explain **three** benefits of transmitting the data using the serial full-duplex data transmission method.

1

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2

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3

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[6]



(d) A checksum is used to check for errors in the data.

A checksum value is calculated from the data before it is transmitted.

Describe how this checksum value is used to check for errors in the data after transmission.

.....

.....

.....

.....

.....

..... [3]

(e) All data that is transmitted across the network is encrypted before transmission.

(i) Give **two** types of encryption that could be used.

1

2 [2]

(ii) Describe what is meant by an encryption key.

.....

.....

.....

..... [2]





3 A student is playing her piano. She uses her tablet computer to record the sound produced by the piano.

(a) The tablet computer has built-in input and output devices.

(i) Give the name of the input device built into the tablet computer that is used to record the sound produced by the piano.

..... [1]

(ii) Identify **one** other input device that can be built into the tablet computer.

..... [1]

(iii) The tablet computer has a display screen to output data for the student.

Give **one** other output device that can be built into the tablet computer.

..... [1]

(b) Explain how the analogue sound waves produced by the piano are represented as digital data.

.....
.....
.....
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..... [4]



(c) The tablet computer has a 1.8 GHz quad-core processor.

(i) Instructions are fetched from random access memory (RAM) into the processor.

The control unit uses a list to decode the instructions into commands that can be processed.

Give the name of the list that is used for this purpose.

..... [1]

(ii) The student wants a new tablet computer that has a 2.4 GHz dual-core processor.

Explain whether the processor of the new tablet computer would have a better performance than the processor of her current tablet computer.

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..... [4]

(d) The tablet computer has a built-in biometric device.

Explain the purpose of the biometric device.

.....
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.....
..... [2]





4 A computer has a central processing unit (CPU).

Identify **three** components that are built into a CPU from the given list.

accumulator (ACC)

binary counter (BC)

binary register (BR)

binary unit (BU)

current instruction register (CIR)

instruction unit (IU)

program counter (PC)

read only memory (ROM)

1

2

3

[3]



5 A student develops a program for their computer science project using a high-level language.

(a) Identify **two** translators that the student could use when developing the program.

1

2 [2]

(b) Explain **two** differences between a high-level language and a low-level language.

1

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.....

.....

2

.....

.....

..... [4]

(c) The student uses a web browser to upload their program to a web page. They bookmark the web page where they have uploaded their program, to make it easier to find the web page again.

(i) Give **one** other function of a web browser that the student could use to find the web page again.

..... [1]

(ii) The web page has a uniform resource locator (URL).

Identify **two** parts of a URL.

1

2 [2]



6 A computer game uses artificial intelligence (AI) to create extra characters (players) in the game.

(a) One characteristic of the AI is that it can adapt and learn.

Give **one** other characteristic of the AI.

.....
..... [1]

(b) The AI uses machine learning.

State what is meant by machine learning.

.....
..... [1]

(c) Explain **one** example of how the AI could use machine learning to create extra characters.

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.....
.....
..... [2]

(d) The computer game has an expert system that can be used to find a solution to any problems with the game. The expert system uses an inference engine.

Explain the role of the inference engine in finding a solution to a problem with the game.

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.....
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.....
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..... [3]



- 7 Cyber security threats are a concern for any company that stores data using a network.

Complete the statements about cyber security threats.

Use the terms from the list. Some of the terms in the list will **not** be used.

You should only use a term once.

adware	bandwidth	components	data
decrypting	encrypting	keylogger	pharming
phishing	sharing	spyware	trojan horse
virus	worm		

A is used to disguise malware. Once it is downloaded onto a computer, it releases the malware that it contains.

A replicates itself to corrupt the data stored on a user's hard disk drive or use up the available memory.

A also replicates itself but the aim is to use up all the of a network.

Ransomware is downloaded onto a computer with the aim of data to stop the user gaining access to it. There is often a demand for payment before the user is given access to the data again.

[5]



- 8 A building has a security keypad that requires the input of a 3-digit denary number. The denary number input is then converted to an 8-bit binary number.

- (a) The denary numbers 071 and 200 are input.

Convert these denary numbers to 8-bit binary numbers.

071

200 [2]

working space

.....

.....

.....

- (b) Two binary numbers are 00101001 and 10110100.

Give the denary numbers that were input for these binary numbers.

00101001

10110100 [2]

working space

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- (c) A microprocessor is used to find out whether a user has input the correct 3-digit denary number.

Explain the role of the microprocessor in this process.

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..... [3]





- (d) A display screen next to the keypad displays the current temperature inside the building.

The current temperature is stored as a two's complement binary integer and is displayed as a denary number.

- (i) Give the denary number that would be displayed for each of the two's complement binary integers.

00100011

11101010

[2]

- (ii) Give the two's complement binary integer that would be stored when the denary number 14 is displayed.

..... [1]

working space

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