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CAMBRIDGE
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CANDIDATE NAME

CENTRE NUMBER

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5878142680

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.

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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]

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(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]

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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]

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(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.

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.....

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.....

.....

..... [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.

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..... [2]

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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]

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(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]

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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]

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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 .....

.....

.....

.....

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]

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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.

.....

.....

.....

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

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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]

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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

.....

.....

.....

.....

(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]

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(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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