CAMBRIDGE
International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/13**

Paper 1 Theory **May/June 2025**

MARK SCHEME

Maximum Mark: 75

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standard isation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	Correct point
	Incorrect point
	Unclear response
FT	Follow through
REP	Repetition
I	Ignore
BOD	Benefit of doubt given
NBOD	Benefit of doubt not given
TV	Content of response too vague
NAQ	Not answered question

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Annotation	Meaning
	Omission
	Section not relevant
	Section incorrect
Highlighter	Information copied from the text
	Page or response seen by examiner

Annotation guidance:

/ separates alternative words or phrases within a marking point
// separates alternative answers within a marking point
Underline actual word given must be used by candidate (grammatical variants accepted)
Max indicates the maximum number of marks that can be awarded
( ) the word / phrase in brackets is not required, but sets the context

Note: No marks are awarded for using brand names of software packages or hardware

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>Microphone</td><td>1</td></tr>
<tr><td>1(b)</td><td>A</td><td>1</td></tr>
<tr><td>1(c)(i)</td><td>• 25
• 180</td><td>2</td></tr>
<tr><td>1(c)(ii)</td><td>• 19
• B4</td><td>2</td></tr>
<tr><td>1(c)(iii)</td><td>00101001</td><td>1</td></tr>
<tr><td>1(d)</td><td>One mark for correct method of working e.g. flip and add 1
One mark for correct answer

−55</td><td>2</td></tr>
<tr><td>1(e)</td><td>One mark for each correct missing term or definition.

<table>
<tr><th>Term</th><th>Description</th></tr>
<tr><td>(sound) sampling/sample</td><td>This is the measurement of the height (amplitude) of a sound wave at regular time intervals.</td></tr>
<tr><td>sample rate</td><td>The number of samples recorded each second</td></tr>
<tr><td>sample resolution</td><td>The number of bits that are used to record each sample</td></tr>
</table>
</td><td>3</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>Virtual memory</td><td>1</td></tr>
<tr><td>2(b)</td><td>Any three from:

Examples:

• Platters are divided into tracks/sectors.
• Platters rotate (to allow data to be read) // has moving parts.
• Has a read/write head.
• Uses an electromagnet.
• Data stored as magnetised dots.</td><td>3</td></tr>
<tr><td>2(c)</td><td>• It is not directly accessed by the CPU.
• It stores data permanently until it is deleted by the user // non-volatile.</td><td>2</td></tr>
<tr><td>3(a)</td><td>One mark for each correct missing term or description.

<table>
<tr><th>Term</th><th>Description</th></tr>
<tr><td>MAC address</td><td>This is the address given to a network interface card (NIC) when it is manufactured.</td></tr>
<tr><td>register</td><td>A component in the central processing unit (CPU) that is used to temporarily store data.</td></tr>
<tr><td>clock</td><td>It controls the number of fetch-decode-execute cycles that are performed per second.</td></tr>
<tr><td>control unit</td><td>A component in the CPU that manages the flow of data around the CPU // A component that decodes the instructions</td></tr>
<tr><td>core</td><td>This is a processing unit within the CPU that can fetch, decode and execute instructions.</td></tr>
</table>
</td><td>5</td></tr>
</table>

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Question	Answer	Marks
3(b)	Any **three** from: • Program counter // PC • Memory address register // MAR • Memory data register // MDR • Current instruction register // CIR	**3**
3(c)	• Control bus • Data bus	**2**

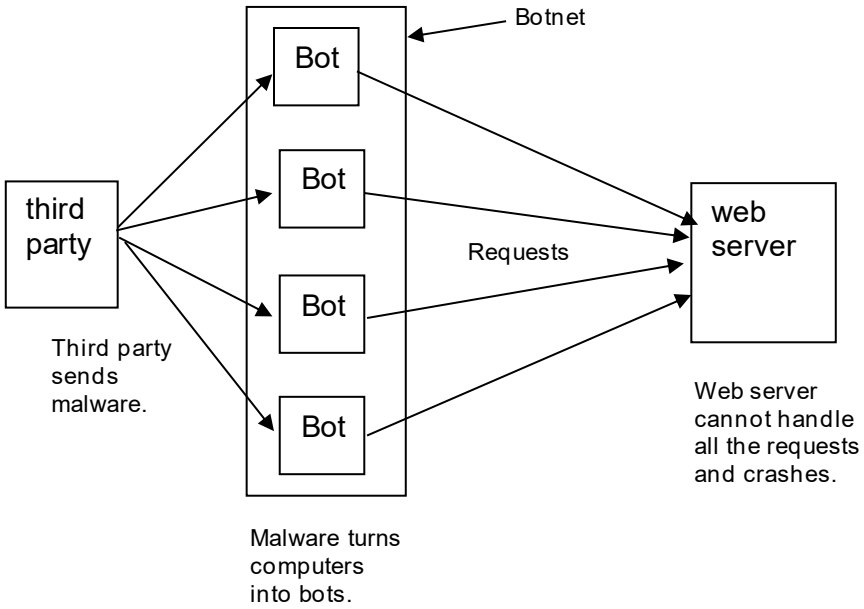
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Question	Answer	Marks
4(a)	Any **two** from: • It assigns a priority to an interrupt. • It uses an interrupt handler / interrupt service routine to process the interrupt. • Maintains/organises the interrupt queue	**2**
4(b)	Any **two** from: Examples: • managing files • providing an interface • managing peripherals and drivers • managing memory • managing multitasking • providing a platform for running applications • providing system security • managing user accounts	**2**
4(c)(i)	Any **one** from: Examples: • key press on a keyboard • button clicks on a mouse • printer out of ink	**1**
4(c)(ii)	Any **one** from: Examples: • division by zero • two processes trying to access the same memory location	**1**

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Question	Answer	Marks
5(a)	Any **two** from: • **storing** a database of URLs and matching IP addresses • **search** its database for the matching IP address. • send the URL to another DNS **if URL cannot be found.** • return the IP address to the web browser	**2**
5(b)	D	**1**

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Question	Answer	Marks
5(c)(i)	**One** mark for each part of the diagram that shows: • A perpetrator/third party sending malware // user downloads/installs malware • Each computer is turned into a bot … • … to create a botnet. • Third party initiates the attack. • **All** the bots send a request at once to the web server. • … crashing the web server. Example:  	**5**
5(c)(ii)	• Hide a public IP address • Caching	**2**
5(d)(i)	B	**1**

Question	Answer	Marks
5(d)(ii)	Any **three** from: Examples: • Store user's login details. • Store user's payment details. • Store user's preferences. • Use for targeted advertising.	**3**
5(d)(iii)	Any **two** from: Examples: • Storing bookmarks/favourites • Recording user history • Allowing use of multiple tabs • Providing navigation tools • Providing an address bar	**2**

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Question	Answer	Marks
6(a)	Any **one** from: Examples: • Microprocessor • Actuator • Storage/memory	**1**
6(b)	Any **one** from: Examples: • Humidity • Light • Level • Infrared	**1**
6(c)(i)	Any **three** from: • A microprocessor is used. • Microprocessor received data from the sensor. • Microprocessor compares data against **preset data of 40**. • If the data is greater than 40 the microprocessor sends a **signal** to trigger the alert.	**3**
6(c)(ii)	Any **three** from: • Data is sent one bit at a time. • … down a single wire. • Data can **only** be sent in one direction.	**3**

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Question	Answer	Marks
6(d)	Any **two** from: Examples: • Employees don't need to carry out a mundane/repetitive task. • Employees don't need to work overnight. • Employees don't need to work outside in adverse weather conditions. • Creates maintenance jobs for system	**2**
6(e)	Any **one** from: Examples: • May de-skill the employees • May replace employees and take their job	**1**
6(f)(i)	Artificial intelligence // AI	**1**
6(f)(ii)	Any **three** from: Examples: • It can **adapt** its own **processes**/**data**. • It could analyse the data for trends/patterns. • … and predict future weather patterns **based on the patterns**. • Feedback is given on weather predictions. • … changes future predictions based on this feedback. • It could learn what weather occurs at certain times of year. • … and use this to predict what the weather would be like at the same time of year. • … and adapt its rules/processes for weather predictions.	**3**

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Question	Answer	Marks
7(a)	• It can suffer Interference/crosstalk. • … that could have caused data loss/gained/changed.	**2**
7(b)	**One** mark for each correct term in the correct place. • odd/even • even/odd (must be opposite of MP1) • bit • echo check • automatic repeat query (ARQ) • timeout • positive/negative or negative/positive A parity check is set to be **odd** or **even**. A parity **bit** is added to each byte before transmission to make it match the set parity. An **echo check** involves comparing the data sent to the data received back from the receiving device. An **automatic repeat query (ARQ)** uses acknowledgement and **timeout**. The acknowledgement system can be **positive** or **negative**.	**8**

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