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CAMBRIDGE
International Education

Cambridge O Level

COMPUTER SCIENCE **2210/12**

Paper 1 Computer Systems **October/November 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 October/November 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 standardisation 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
TV	Content of response too vague
NAQ	Not answered question
	Omission

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

Mark scheme abbreviations

/	separates alternative words / 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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Question	Answer	Marks
1(a)	FFF	**1**
1(b)	4095	**1**
1(c)	0100 0010 1001 0001 1010 0011	**2**
1(d)	8A1 70B	**2**
1(e)(i)	Microprocessor	**1**
1(e)(ii)	A	**1**
1(e)(iii)	Light	**1**
1(e)(iv)	Any **four** from: • The **disk** is spun • A laser is shone onto the disk • **Pits** are **burnt** into the disk • Pits are in a (spiral) track • **Pits** and lands represent binary values	**4**

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Question	Answer	Marks
2(a)	One mark for each correct nibble (2) One mark for a correct method of working for example 4 or 5 correct carries One mark for showing an overflow error (1) 111 1 11110101 + 00111001 1 0010 1110	4
2(b)	One mark for showing the binary number after the shift One mark for valid method of working to convert to denary One mark for correct denary number • 00011110 • 16 + 8 + 4 + 2 • 30	3

Question	Answer	Marks
3(a)	Any **two** from: • Low-level language • Uses mnemonics • Used to **communicate directly** with the computer hardware	2
3(b)	Assembler	1
3(c)	B	1

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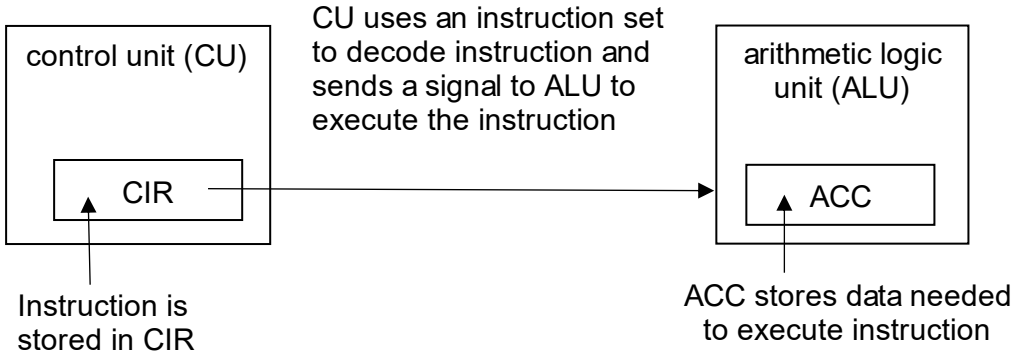
Question	Answer	Marks
4(a)	**One** mark for each correct part of the diagram. The diagram shows: • CIR is built into CU • CIR stores instruction • CU decodes the instruction • Instruction is decoded using an instruction set // Instruction is separated into opcode and operand • Signal is sent from CIR to ALU (to execute) • CU sends signal to RAM to fetch any data needed for instruction • ACC is built into ALU • ACC stores any data needed for instruction • ALU executes the instruction // ALU performs the mathematic/logical operation (needed by the instruction) Example: 	**5**
4(b)	Any **two** from: • Independent/self-contained **processing** unit • It executes/processes **instructions** // It performs the FDE cycle • It contains registers/units (to process data)	**2**

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Question	Answer	Marks
4(c)	**Four** from (MAX 2 if no expansion given): • The number of cores could be increased // by example … • … this means that more instructions can be processed **simultaneously** • The clock speed could be increased // by example … • … this means that more instructions can be processed (by a core) **per second** • The cache could be increased // by example … • … this means that more frequently used data/instructions can be stored (to be accessed faster than RAM)	**4**

Question	Answer	Marks
5(a)	Hardware (interrupt)	**1**
5(b)	Any **four** from: • Checks the **priority** of the **interrupt** • If priority is higher, it **halts** the current process • … stores it on a stack • … fetches the interrupt • … checks the source of the interrupt • … calls the interrupt service routine (ISR) / interrupt handler to process the interrupt • If priority is not higher, it continues with current process	**4**
5(c)(i)	• It is sent one bit at a time • It is sent down a single wire	**2**

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Question	Answer	Marks
5(c)(ii)	Any **two** from: • The mouse can be powered by the device • It is a universal connection • It is backward compatible • Less chance of skewing // Less chance of errors • Supports different data transmission speeds • Adequate transmission speeds • The cable cannot be inserted incorrectly • The device is **automatically detected** // **Driver** is **automatically installed** when device is connected	**2**
5(c)(iii)	Any **one** from: • Slower transmission than a **parallel** connection • Wire may get in the way // wire may limit movement of mouse	**1**

Question	Answer	Marks
6(a)	**One** mark for each correct label • Protocol • Domain name • Web page name // file name	**3**
6(b)	Any **three** from: • It examines each request/incoming transmission • It can **slow down the rate at which/limits the number of** requests sent to the server • It can use caching … • … to respond to the request (rather than forwarding it to the server) • It can stop any requests from a certain **IP**	**3**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>6(c)</td><td>One mark for each correct missing term or definition.

<table>
<tr><th>Term</th><th>Description</th></tr>
<tr><td>hypertext markup language (HTML)</td><td>It is the language that is often used to write/author web pages.</td></tr>
<tr><td>domain name server (DNS)</td><td>It is a system that stores URLs/domain names and their matching/corresponding IP addresses // It is a system that provides the matching IP address for a webpage to the web browser.</td></tr>
<tr><td>IP address</td><td>It is a numerical address used to locate the web server.</td></tr>
<tr><td>SSL/TLS/HTTPS</td><td>It is a secure protocol that can be used to transmit data sent to and from a web server.</td></tr>
<tr><td>web browser</td><td>It is a piece of software that is used to display web pages.</td></tr>
</table></td><td>5</td></tr>
<tr><td>6(d)</td><td>One mark for each correct missing term in the correct place.

Cookies are stored and managed by the web browser.
Session cookies are temporary files that are created when a user visits a web page.
Persistent cookies are permanent files that are created when a user visits a web page.</td><td>3</td></tr>
</table>

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Question	Answer	Marks
7(a)	• It does not have a **mechanical** structure • It does not have any actuators • … so it cannot move itself	**3**
7(b)	Microphone	**1**
7(c)	Any **four** from: For example: • Gather data from the same/different voices // It can ask a user to say lots of different words • **Analyse/identify patterns** in a user's voice • It can **adapt** its own **processes** • It can learn to **identify** a **user's** voice • Stores successful/unsuccessful voice commands • It can learn different ways of making the same request • It can learn the different pronunciations // It can learn different accents • It can learn by listening to lots of different voices • It can learn to ignore any background/environmental noise if a user is speaking	**4**
7(d)	Any **two** from: • It has a single/limited function • It has dedicated hardware • It has a microprocessor • Its function is not easily changed	**2**

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Question	Answer	Marks
7(e)	Any **two** from: For example: • The music/books can be easily accessed from **any smart speaker** • The user **doesn't need to purchase** a secondary storage device for the books/music // Smart speaker **doesn't need a large amount** of secondary storage • The user doesn't need to maintain the storage needed for the books/music • Smart speaker can be smaller in size (as it doesn't need large amounts of secondary storage) • Almost unlimited storage available for the books/music // Easy to increase storage capacity needed	**2**
7(f)(i)	Any **two** from: • Data could be lost • Data could be gained • Data could be changed • Skewing of data could occur • Interference could occur • Crosstalk could occur • Data collisions could occur • Data packets could time out/reach their hop count	**2**
7(f)(ii)	Any **two** from: • Parity byte check • Parity **block** check • Checksum • Echo check • ARQ	**2**

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