# Cambridge International AS & A Level

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| **INFORMATION TECHNOLOGY** | **9626/12** |
| Paper 1 Theory | **May/June 2025** |
| MARK SCHEME | |
| Maximum Mark: 70 | |

**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.

This document consists of **11** printed pages.

**[Turn over**

## 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.

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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.

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GENERIC MARKING PRINCIPLE 2:

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

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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.

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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).

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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 |
|---|---|
| BOD | Benefit of the doubt |
| λ | To indicate where a key word/phrase is missing |
| ✖ | Incorrect |
| ∿ | Indicate a point in an answer |
| ISW | Ignore subsequent work |
| LNK | Statement/points are linked |
| MAX | Maximum number of marks that can be awarded |
| NAQ | Not answered question |
| Off-page comment | Allows comments to be entered at the bottom of the RM marking window and then displayed when the associated question item is navigated to. |
| REP | To indicate a point that has already been made or was given in the question |
| SEEN | Indicates that work/page has been seen including blank answer spaces and blank pages. |
| ✔ | Correct |
| TV | Too vague |
| ⦚ | Indicate a point in an answer |

| Question | Answer | Marks |
|---|---|---|
| 1(a) | **Four marks from:**<br><br>• A larger sample size (1)<br>• A larger/large set of data to be examined (1)<br>• It allows data to be gathered from subjects to whom the data gatherer<br>• does not have physical access (allow concept) (1)<br>• Using less time (to collect the data)//data is readily available//already exists (1)<br>• Data collected indirectly has **already** been **collated/grouped** (1)<br>• Data collected indirectly has **already** been **processed** (1)<br>• Information can be of a higher quality. (1)<br>• Costs of (e.g.) travel//printing//employing interviewers avoided (**must state the cost saved**) (1) | 4 |
| 1(b) | **One mark per bullet point to a maximum of four marks.**<br><br>• The data may be out of date (1)<br>• The data may be costly to purchase (1)<br>• Inappropriate//irrelevant sample (who is asked//size) (1)<br>• Irrelevant questions asked//methods used//data gathered (1)<br>• The data may not meet the company's needs//different purpose (1)<br>• The data may not be **specific enough**//lacking **detail**. (1) | 4 |

| Question | Answer | Marks |
|---|---|---|
| 2(a) | **Max 4 from:**<br><br>***VLOOKUP***<br>• It takes the B from **cell D12** (1)<br>• It looks for B in cells **D5:E8** (1)<br>• Returns/finds the corresponding value//20%//discount percentage (1st)<br>  – from column E/2nd **column** from the range (1)<br>• It looks for an exact match//If it does not find an exact match it will return an error (1)<br><br>**Max 2 from:**<br><br>***CALCULATION***<br>• It multiplies the percentage discount by the Price (1)<br>• Subtracts discount from the original price. (1) | 5 |
| 2(b) | **Four marks from:**<br><br>• **Both** are needed because some cell references need to remain the same (1) whilst others change (1).<br>• **Absolute cell referencing** always refers to the same cell therefore does not change (1st)<br>  – Valid example of a cell reference that must not change (1)<br>• **Relative cell referencing** changes depending on the position in the spreadsheet//may exemplify new positions (1st)<br>  – Valid example of a cell reference that must change. (1) | 4 |

| Question | Answer | Marks |
|---|---|---|
| 3(a) | **One mark per bullet point to a maximum of two marks**<br><br>• Questions are displayed on the user interface (1)<br>• The user types in the problems/answers the questions (1)<br>• Outputs explanation of findings (1)<br>• **Outputs** suggestions/probabilities of possible solutions. (1) | **2** |
| 3(b) | **One mark per bullet point to a maximum of two marks.**<br><br>• Acts as the reasoning system (1)<br>• Compares the faults with those held in the **knowledge base** (1)<br>• Uses/searches the rules base//set of rules (1)<br>• Uses IF THEN (1)<br>• Use backwards/forwards chaining (1)<br>• Produces suggestions/solutions (1). | **2** |

| Question | Answer | Marks |
|---|---|---|
| 4 | **One mark per heading to a maximum of four marks.**<br><br>Cost: valid comment on cost e.g.<br>• Custom written software can be more expensive (than off-the-shelf software) (1)<br><br>Ownership: valid comment on ownership e.g.<br>• Custom written software is owned by the company that commissions/creates/buys it (1)<br>• off-the-shelf software means the company only has a licence (1)<br><br>Degree of testing: valid comment on degree of testing e.g.<br>• Custom written software is tested by the users as part of its development (1)<br><br>Level of support: valid comment on level of support e.g.<br>• Custom written software means that support is available directly from the creators (1)<br>• Off-the-shelf usually provide call centres which may not be able to solve problems specific to the company (1)<br><br>Customisation: valid comment on customisation e.g.<br>• Off-the-shelf software may have several unnecessary features that the company may not need/custom written software has **only** the features the user needs (1)<br>• Off-the-shelf software has to be adapted to fit the company that has purchased it (1)<br><br>Availability: valid comment on availability e.g.<br>• Off-the-shelf software is available to all businesses and companies/general public not just a specific company/business (1)<br>• Off-the-shelf software is ready-written/ready for use and already exists/there is often a delay between commissioning and receipt of custom written software. (1)<br><br>Compatability: valid comment on compatabilty e.g.<br>• Off-the-shelf software may not work with your current hardware (1) | 4 |

| Question | Answer | Marks |
|---|---|---|
| 5 | **One mark per bullet point to a maximum of five marks.**<br><br>• Computers can collect readings (from sensors) at **more** frequent intervals (1)<br>• Computers are capable of accessing more than one variable **simultaneously** (1)<br>• Computers work **any time**, **day or night//24/7** (1)<br>• Computers accept readings at precise/regular intervals (1)<br>• Computers can be programmed to **automatically** (NOT immediately) take action on readings (1)<br>• Computers will always accept the readings/do not forget (1)<br>• It is safer to have a computer take readings **in extreme conditions (1)**<br>• No need to **input** the **data** manually//avoids **data input/recording** mistakes (1)<br>• Improved **processing** speed (1)<br>• Improved accuracy of **processing** (1) | **5** |

| Question | Answer | Marks |
|---|---|---|
| 6 | **One mark per bullet point to a maximum of six marks.**<br><br>• Publish anti-malware policies for staff (1)<br>• Teach employees to report malicious websites//suspicious emails to e.g. the network manager/compliance (1)<br>• Instruct employees to be suspicious about clicking on links (1)<br>• Instruct employees that they must not connect removable media/memory sticks/personally owned device to their computer/the network (1)<br>• Provide a dedicated stand-alone/sandbox computer to check for viruses (1)<br>• Keep operating systems/browser software/anti-virus software/the software up to date (anti-malware sw is the focus of the question) (1)<br>• Install/maintain a firewall (any awareness) (1)<br>• Block employees from downloading software/files onto the computer (1) | **6** |

| Question | Answer | Marks |
|---|---|---|
| 7 | **One mark per bullet point to a maximum of five marks.**<br><br>• Indexed sequential access is a mixture of sequential access and direct/random access (1)<br>• A set of hash tables known as indexes contain pointers into the records/index value is generated (1)<br>• The index is a pointer to whereabouts on the disk the record is stored (1)<br>• Individual records can be retrieved without having to search the entire file (1)<br>• Data is organised into records which consist of fixed length fields (1)<br>• Records can be found randomly using an index (1)<br>• Indexes can be searched quickly, thereby allowing the database to access only the records it needs (1)<br>• Searches use an index which will narrow down the records/data to be<br>• searched//focuses on a subset of records (1st)<br>   – Then that section of the file is searched sequentially to find the record required. (1) | 5 |

| Question | Answer | Marks |
|---|---|---|
| 8 | **Max one from:**<br><br>• An actuator converts energy into action//mechanical motion (1)<br>• Performs a movement//**physical** action (1)<br>• An actuator reacts to a signal to make something move (1)<br><br>**Max one from:**<br><br>***EXAMPLE***<br>• linear<br>• rotary<br>• soft<br>• hydraulic<br>• pneumatic<br>• electric<br>• thermal<br>• magnetic<br>• mechanic. | 2 |

| Question | Answer | Marks |
|---|---|---|
| 9 | **Max 6 from three matched pairs** | **6** |
| | • Different software on Eric's computer than his friends' computers (1st) <br>    – E.g. use generic file type (1) <br> • Saved in a different/wrong (file) format (1st) <br>    – E.g. use generic file format (1) <br> • Anti-Virus does not allow file to open/File has a virus (1st) <br>    – E.g. Eric needs to virus check the file before sending it (1) <br> • File is password protected/encrypted and Eric didn't share the password/decryption key (1st) <br>    – E.g. Eric needs to share the password (1). <br> • Wrong access rights/permissions assigned to the file (1st) <br>    – E.g. grant access rights/permissions (1) | |

| Question | Answer | Marks |
|---|---|---|
| 10 | **Six marks from:** | **6** |
| | • No need to physically interact (may exemplify) (1st) <br>    – Can be more hygienic (1) <br>    – Can undertake other tasks at the same time (1) <br>    – Can operate the device remotely (1) <br>    – Can be triggered without meaning to (1) <br>    – More accessible to disabled users (may refer to device itself or devices around the home) (1) <br> • The dialogue interface relies on speech/sound (1st) <br>    – User has to be in range (1) <br>    – Can undertake other tasks at the same time (1) <br>    – Can operate the device remotely (1) <br>    – External noise may result in the dialogue interface not understanding the command (1) <br>    – If a person has a speech impediment, may find dialogue interface difficult to use (1) <br>    – Dialogue interface may misinterpret what is said (1) <br>    – More accessible to disabled users (may refer to device itself or devices around the home) (1) <br>    – Person may not speak **supported** language/dialect (1) <br> • Audible acknowledgement (1st) <br>    – Know that instruction/command has been actioned (1) <br><br> • One mark for a valid conclusion (1) | |

| Question | Answer | Marks |
|---|---|---|
| 11 | **Max FOUR marks, TWO per paired answer**<br><br>• **Length check** (1st)<br>   – Checks that the length of the data is **exactly** 7 characters (1)<br><br>• **Format check** (1st)<br>   – Checks that each item of data begins with two letters followed by 5 digits (accept exemplification) (1)<br><br>• **Presence check** (1st)<br>   – Checks that there is data present in this field (1). | 4 |

| Question | Answer | Marks |
|---|---|---|
| 12 | **One mark per explanation to a maximum of three marks.**<br><br>• **Banks require 24/7 operation** and mainframe computers have a high level of Reliability Availability and Serviceability (RAS) to keep the system running (1)<br>• **Banks require 24/7 operation**<br>• ONE FROM<br>   – and it must be possible to upgrade/replace/maintain the system without shutting down the system (1)<br>   – Mainframe Computers have a high level of serviceability//avoid downtime (1)<br>• **Banking transactions need to be highly secure** and mainframe computers have high levels of security (1)<br>• **Banks hold sensitive information** so high fault tolerance of mainframe computers means that data integrity is maintained (1)<br>• Mainframes have the ability to transfer processing from one core to another so that processing is uninterrupted if it breaks down and so bank service is **not interrupted//needs to be 24/7** (1) | 3 |

| Question | Answer | Marks |
|---|---|---|
| 13 | **One mark from**: <br> • Definition of encryption (1) <br><br> **Max 6 from:** <br> *Benefits:* <br> • Content of the web page cannot be understood **by any third-party (**accept any awareness**)** <br> OR <br> Can only be understood when decrypted//cannot be understood without decryption key (1) <br> • Only access by authorised users (1) <br> • Encrypted connections make man-in-the-middle attacks ineffective (1) <br> • Reduces the impact of would be/potential hackers (1) <br> • Dissuade/deters hackers (1) <br> • Content of the web page (being transferred) is kept private (1) <br> • Gives users confidence (1) <br><br> **Max 6 from:** <br> *Drawbacks:* <br> • Encryption uses a lot of server resources (1) <br> • Requires processing power/memory (1) <br> • Encryption introduces latencies/delays//takes **more** time to transfer data (1) <br> • Connections take **longer** to set up (1) <br> • <u>More</u> data exchanges as keys have to be exchanged (1) <br> • Need to **buy** an SSL certificate (1) issued by certificate authorities (1) <br> • There are proxy caching problems. (1) | 8 |