CAMBRIDGE
International Education

# Cambridge International AS & A Level

**INFORMATION TECHNOLOGY** **9626/33**

Paper 3 Advanced Theory **October/November 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 October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

## 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.

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.

 

## 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 |
|---|---|
|  | Benefit of the doubt |
|  | To indicate where a key word/phrase is missing |
|  | Incorrect |
|  | Indicate a point in an answer |
|  | Ignore subsequent work |
|  | Statement/points are linked |
|  | Maximum number of marks that can be awarded |
|  | 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. |
|  | To indicate a point that has already been made or was given in the question |
|  | Indicates that work/page has been seen including blank answer spaces and blank pages. |
|  | Correct |
|  | Too vague |
|  | Indicate a point in an answer |

**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

| Question | Answer | Marks |
|---|---|---|
| 1 | **Four from:**<br>• Base station connected to public telecommunications network / service provider that connects to public telecoms (1st)<br>– Has antenna / receiver / transmitter (1)<br>• Uses low power / short range<br>• Radio / signals / wireless communications<br>• (Each base station) has range of / 10–50 frequencies allocated<br>• Different set of frequencies to adjacent base stations<br>• Base station serves / covers small geographical area / terrain landscape<br>• Base station uses towers (to increase height of antennae)<br>• Many base stations used to cover large areas / cities<br>• Handoff system to allow seamless movement from one base station to next (as users connect / disconnect from base stations as they move from place to place) | **4** |

| Question | Answer | Marks |
|---|---|---|
| 2(a) | **Two from:**<br>• The steps needed to complete a task / activity<br>• The resources needed for each step<br>• The team members / workers needed for each step<br>• How the team members / worker interact with each other<br>• Indication of order of tasks / jobs | **2** |
| 2(b) | **Four from:**<br>• Used to show critical path within a project<br>• Used to decide / shows the order of tasks<br>• Shows where resources should be allocated<br>• Shows where / how / which staff / workers should be allocated<br>• Shows when resources should be allocated / made available<br>• Used to calculate the cost of each activity / task<br>• Used to automatically send orders for resources<br>• Used to generate alerts / reminders (used to link to calendar / diary of managers / team members / workers) | **4** |

 

| Question | Answer | Marks |
|---|---|---|
| 3 | **Eight from:**<br><br>**Command word: Discuss – write about issues(s) or topic(s) in a structured way.**<br><br>*Content areas could include e.g.:*<br>• Global warming due to e.g. $CO_2$ production<br>• Use of smart energy meters to monitor energy use<br>• Raise awareness of energy use / reduce energy use / reduce $CO_2$ production<br>• Connecting cars / vehicles to the internet navigation services / directing them onto optimal routes<br>• Saves car driving time fuel so less $CO_2$ production<br><br>• Protection of wildlife / monitoring species endangerment / protection using IoT devices to track wildlife / biodiversity<br>• Devices fixed to trees / animals to monitor wildlife activities<br>• Remote monitoring / listening devices / cameras of conservation areas to prevent e.g. hunting / poaching<br>• Valid example e.g. monitoring inside beehives to protect bee colonies, bees responsible for pollination / food production<br>• Listening devices on trees to monitor (illegal) logging<br><br>• Automatic management / preservation of resources e.g. heat / water / light / waste<br>• (IoT connected devices) allow more precise control over deployment / use / removal / conservation than possible by humans<br>• Valid example e.g.: automatic re-ordering of goods by refrigerators / remote control of heating / climate control systems / ordering of e.g. fertilisers / animals by farmers / automatic milking systems / water leak sensors<br>• Reduction in waste of resources<br>• Increased food security<br><br>• E-waste increase due to more devices<br>• Increase in communication traffic<br>• IoT devices are always 'on' / active<br><br>• Increase in use of electrical power<br>• Smart homes use more electrical power<br>• Technology uses more energy so increased $CO_2$ production<br>• Heat output from devices<br>• Increase in production of heat<br>• Increase in battery use / more batteries produced / discarded<br>• Add to landfill / disposal requirements / recycling | **8** |

 

| Question | Answer | Marks |
|---|---|---|
| 4(a) | **One from:**<br>• Database (table) / spreadsheet (workbook / sheet) containing related data in a file // related data in a file / database / table / spreadsheet / workbook / sheet | **1** |
| 4(b) | **Four from:**<br>• Manageable / same time / all in one go / simultaneous analysis of large quantities of data<br>• Interactive analysis of data / can 'see' into / have insights into large amounts of data<br>• Can generate multiple reports from single / same data set<br>• Simple / easy / little training / specialist knowledge needed to carry out the analysis<br>• Rapid discovery of patterns in complex data<br>• Can work with external files / SQL generated exports of data in reports. | **4** |

| Question | Answer | Marks |
|---|---|---|
| 5(a) | **Three from:**<br>• Complete message is sent / transferred at once / in one go<br>• Message contains destination address<br>• Address used to send message to destination / route the message to next node<br>• Store and forward method of transmission used (by intermediate nodes / router / switch / email servers) | **3** |
| 5(b) | **Four from:**<br>• Makes efficient use of available bandwidth because connections / data links / channels are shared between devices<br>• If network fails / congestion message is not lost because messages are stored at message switches / intermediate nodes / mail servers<br>• Networks / devices can be configured to prioritise messages so that important messages arrive first<br>• Messages can be broadcast to several destinations at once to avoid repeating the message<br>• Storage of message by node so message is not lost / retries of sending are possible. | **4** |

 

| Question | Answer | Marks |
|---|---|---|
| 6 | **Eight from:**<br><br>**Command word: Discuss – write about issues(s) or topic(s) in a structured way.**<br><br>**Max six from:**<br>*Advantages:*<br>• No wires to cause physical / electrical hazards for customers / staff<br>• Can be used where physical wiring is not possible / too expensive / not allowed<br>• No installation / maintenance of physical wiring / infrastructure so costs are reduced<br>• Cleaning / servicing (of checkout areas) is more convenient without network wiring<br>• Checkouts / point of sale terminals can be added / removed without disrupting network connections<br>• Checkouts / point of sale terminals can be moved / relocated without the need to alter network wiring<br>• No need to damage / alter e.g. walls / displays / floors / infrastructure<br>• No cables to get damaged<br><br>**Max six from:**<br>*Disadvantages:*<br>• Requires complex / more network security / enforced security than wired connections<br>• Range is limited / affected by obstacles / materials / goods / construction materials in store<br>• More WAPS may be needed to cover the area / network becomes more complex<br>• Range may restrict the placement of checkouts / point of sale terminals<br>• More susceptible to unauthorised access / eavesdropping / cyber attacks<br>• Range may extend beyond store perimeter so more difficult to keep secure<br>• Susceptible to interference from other / staff / customer Wi-Fi devices<br>• From electrical devices in the store / valid example e.g.: food freezers / TV sets. | **8** |

 

| Question | Answer | Marks |
|---|---|---|
| 7 | **Six from:**<br>• JS code embedded within HTML<br>– inside < / script> tags<br>• `ALP3` is given id in line 4<br>• Array qp holds the text for display / ["A Level", "IT", "9626", "Paper", 3]<br>• Variable paper declared / initialised to empty / blank / null / zero<br>• `for in` used to loop / iterate through array<br>• Variable x used to count / hold array items during loop iterations<br>• Variable paper used to construct / hold array item plus line break<br>– `BR` used to force line break on web page<br>• Contents of variable paper written / passed back to HTML… `using document.getElementById("ALP3").innerHTML = paper`<br>– HTML element with id `ALP3`<br>– initiated before script as blank<br>– JS changes its content to contents of variable paper<br>– displayed on web page<br>• Iterates through array until no more items left<br>– JS script / code terminates / stops | **6** |

| Question | Answer | Marks |
|---|---|---|
| 8 | **Six from:**<br>• Use of timeline<br>– to decide when movement occurs<br>– how fast movement occurs / how fast change of position occurs<br>• Spacing / position of object within a frame<br>– change from frame to frame<br>– smaller spacing appears as slower movement<br>– larger spacing appears as faster movement<br>• Number of frames used to complete the movement<br>– many frames appear as slow movement<br>– few frames appear as fast movement<br>– animating on ones / twos / threes<br>– on 1s means fast action<br>– on 2s means 'normal' movement<br>– on 3s means slow movement<br>• Use 'slow in slow out' approach<br>– first / last few frames / spacing of movement less than middle set of frames<br>– more realistic start / stop of movement | **6** |

 

| Question | Answer | Marks |
|---|---|---|
| 9 | **Four from:**<br>• A digital representation of sovereign / country's currency<br>• Issued by a central bank / central monetary authority<br>– which guarantees / backs / supports the CBDC<br>– considered to be legal tender<br>• Value set against the flat currency / usual currency<br>• Easily transferred using peer-to-peer networking | **4** |

| Question | Answer | Marks |
|---|---|---|
| 10(a) | **Four from:**<br>• BitTorrent client installed / used on device<br>• Uses BitTorrent protocol to connect to other clients / devices<br>• It is a peer-to-peer network of connected devices / devices connected into BitTorrent 'swarm'<br>• Data / files are transferred between devices directly / without a central server<br>• Connected devices use a distributed hash table (DHT) to track other clients / are tracked by others / use of a .torrent file by BitTorrent client / by tracker device<br>• Connected devices have the IP addresses shared with all other connected devices<br>• Tracker device does not contribute / store / send any data files<br>• Clients search for files / files located on other clients using the DHT<br>• Files are downloaded in bits / parts / sections<br>• (downloaded) from multiple clients / different clients<br>• Files are reconstructed by the client<br>• Clients supplying files share their bandwidth to reduce time for file download to client<br>• Clients with complete / fully downloaded files share with other clients | **4** |
| 10(b)(i) | **Three from:**<br>• BitTorrent protocols use a large amount of the available bandwidth which increases network traffic / slows network down<br>• Many users all attempting to find / access / download files using BitTorrent so it makes it appear that a DDoS attack is underway<br>• BitTorrent is based on UDP so source addresses can be 'spoofed' / changed / disguised<br>• BitTorrent files can carry malware (which is distributed to all users)<br>• It can be used to distribute / download copyright / illegal materials so can cause legal problems for the network owners<br>• Contravenes company acceptable use policy so may be a training / disciplinary issue // not using company network for work purposes | **3** |
| 10(b)(ii) | **One from:**<br>• Set up a VPN<br>• Disguise / encrypt the BitTorrent protocol as another protocol / use Message stream encryption / Protocol encryption (MSE / PE) to avoid its detection | **1** |

| Question | Answer | Marks |
|---|---|---|
| 11 | **Eight from:**<br><br>**Command word: Discuss – write about issues(s) or topic(s) in a structured way.**<br><br>**Max one from:**<br>• The old system is stopped and the new system starts / is used immediately / overnight<br><br>**Max six from:**<br>*Benefits:*<br>• The benefits of the new system can be had immediately after installation / implementation<br>– no delays / loss of work / production / service / deliveries / shipments<br>• Fastest method of installation / implementation compared to other methods<br>– reduced loss of profit and no loss of customers<br>• Only one system is running at any one time<br>– no need to have two sets of hardware / staff<br>– reduced costs of staffing<br>• New system is less likely to have issues / problems / bugs<br>– as has been fully tested before deployment<br><br>**Max six from:**<br>*Drawbacks:*<br>• Staff have to be trained before the new system is installed<br>– staff have to be trained instead of doing real / proper job<br>– reduced productivity by work force during training<br>– staff cannot be trained on a live system<br>– staff have to be trained on a simulated / training system<br>– staff can make mistakes on a training system so get a false sense of security<br>• Old system data has to be transferred to new system<br>– increased risk of data loss<br>– can be time-consuming so may introduce delays<br>– no fallback option if new system fails<br>– stock data may be permanently lost<br>– deliveries / shipments / business may stop / fail<br>• No system at all / may not be available during the point of changeover<br>– old system is not available if the new system fails<br>– so business may not be available to operate | **8** |

 