

Cambridge International AS & A Level

INFORMATION TECHNOLOGY**9626/12**

Paper 1 Theory

May/June 2026**MARK SCHEME**Maximum Mark: 70

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

This document consists of **21** printed pages.

General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: - the specific content defined in the mark scheme - the specific skills defined in the mark scheme or in the level descriptions - the standard of response required as exemplified by the standardisation scripts.
2	Examiners must award whole marks (not half marks, or other fractions).
3	Examiners must award marks positively . This means that: - marks are not deducted for errors or omissions - marks are awarded for correct/valid answers as defined in the mark scheme and also for other valid answers which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate - the quality of spelling, punctuation and grammar are judged only when the mark scheme indicates that these features are specifically assessed in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must consistently apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the full range of marks defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and must not award marks with grade thresholds or grade descriptions 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.

Annotation	Meaning
	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

Question	Answer	Marks	Guidance
1(a)(i)	ONE from: - Questionnaire (e.g.) where questions are asked//customers are asked their opinions (1) - Interview is (e.g.) a face to face meeting/questions are asked (1) - Observation where situations are watched (1) - Surveys (e.g.) where questions are asked (1)	1	Marks may only be awarded where the method has been stated. Answer MUST do more than identify a method
1(a)(ii)	ONE from: e.g. - Textbooks (1) - Journals (1) - Websites//research published online (1) - Someone else's (e.g.) questionnaire (1) - Market research DONE FOR someone else (1) - Government statistics (1) - Newspapers/magazines (1)	1	Do Not Award: - Weather data - Census data - Electoral register - Any source that would not include expenditure patterns - Any source where it is not clearly someone else's

Question	Answer	Marks	Guidance
1(b)	Four marks available: TWO from relevance: • Reduces the chance of excess/unnecessary data (accept converse) (1) • The businesswoman has control over what information is gathered (accept exemplification) e.g. ask questions about sports goods (1) • The businesswoman can design the method/stated method, so can ensure that the (e.g.) questions asked gather the information she needs (1) • Can ensure data is gathered from the town where she will open the shop (1) • Data is obtained/collected with the set purpose in mind (1) TWO from age: • The questions are being asked now (1) • The age of the data is a measure of how long ago it was collected (1) • Use of a direct data source means that data can be/is more up-to-date (1) • Patterns of behaviour/attitudes change over time//what was correct (e.g.) twenty years ago is not necessarily correct now (accept converse about direct data) (NOT 'things could have changed' – TV (1)	4	

Question	Answer	Marks	Guidance
1(c)	Four marks available. Two per matched explanation: Identify reason (1) and state why it is a reason/why beneficial (1) Areas for consideration (Note: may also be used as expansion. Mark as candidate's intension) • Larger sample size (must be the concept of more data/more people asked) • Less biased/more accurate/more reliable NB accuracy or reliability could be used as an extension of (e.g.) less biased for two marks • Wider variation/type of people • Seasonal nature of some sports • Convenience • No time to collect data so use someone else's • Avoidance of a cost (1) such as (1) • Quicker to achieve results (of analysis) Exemplar answers • The sample size may be larger (1) therefore the results gathered are less likely to be biased (1) • She may not have the time to collect the data (1) and so uses data gathered by someone else (1)	4	

Question	Answer	Marks	Guidance																											
2(a)	EIGHT marks available:	8	Each answer is CAO ONLY considers answers on the table																											
	<table><tr><th>Line</th><th>Item to be added</th><th></th></tr><tr><td>80</td><td>4</td><td>1</td></tr><tr><td>90</td><td>Number (accept lower case)</td><td>1</td></tr><tr><td>100</td><td>></td><td>1</td></tr><tr><td>110</td><td>THEN (accept lower case)</td><td>1</td></tr><tr><td>130</td><td>ELSE (accept lower case). Do not award ELSEIF</td><td>1</td></tr><tr><td>140</td><td><</td><td>1</td></tr><tr><td>170</td><td>ENDIF (DO NOT accept lower case or if split)</td><td>1</td></tr><tr><td>180</td><td>Count + 1 (accept lower case)</td><td>1</td></tr></table>			Line	Item to be added		80	4	1	90	Number (accept lower case)	1	100	>	1	110	THEN (accept lower case)	1	130	ELSE (accept lower case). Do not award ELSEIF	1	140	<	1	170	ENDIF (DO NOT accept lower case or if split)	1	180	Count + 1 (accept lower case)	1
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	170			ENDIF (DO NOT accept lower case or if split)	1																									
180	Count + 1 (accept lower case)	1																												
2(b)	FOUR from: - It is the only number that has been entered at that stage (1st) there is no comparison to be made (1) (award once only) - It must be both largest and smallest (1st) there is no comparison to be made//any comparison would be comparing a number with itself (1) (award once only) - Ensures that the highest/lowest mark recorded is valid (1) - Overwriting both set values with a value inputted by the user (1) - One mark for a numerical example of either lower or higher number being ignored (1)	4																												

Question	Answer	Marks	Guidance
3(a)	TWO marks available: • (Data) import from a different source/spreadsheet/database (1) • User forms which provide input boxes/radio buttons (1) • Macros to run input boxes (1) • Drop down lists from which can select an answer (1) • Input boxes linked to specific cells (1) • Copy and paste from another source/spreadsheet/database (1) • Autofill populate cells based on a set pattern/repeated data (1) • Fill series populate cells based on a set pattern (1) • Radio buttons to select options (1)	2	

Question	Answer	Marks	Guidance
3(b)	FOUR from: • Spreadsheet software allows what-if analysis to be carried out (award any mention of what if analysis) (1) • Can sort data into a rank order (concept of ordering) (1) • Can use macros which can create routines /subroutines (1) • Macros/subroutines can carry out fixed routines//e.g. goal seek (1) • Conditional formatting can show/highlight data ONE FROM that matches//is greater than//less than criteria (1) based on rules/conditions (may exemplify) (1) • Carries out calculations such as subtraction (accept any example of a calculation) (1) • Formulae can be created for calculations (1) • Functions can perform set tasks OR (one mark in total) Uses Functions such as OR (one mark in total) Identifies a function by name and states what it does (1) • Charts/graphs to present values//allow for comparison//visualise data (1) • Pivot Tables to analyse large quantities of data in a visual form (1) • Filtering based on set criteria (may exemplify e.g. for a certain class) (1)	4	Award first four attempts only Do Not Award: Features which are NOT directly to do with analysis

Question	Answer	Marks	Guidance
4(a)	FOUR from: • Both methods check that the information entered matches the <u>original/the book/the source</u>//has been inputted correctly (1) Accuracy • Neither method checks if the source data is correct (1) • Double data entry is more accurate (accept converse) (1) • Visual checking may be affected by human error//checker may miss error//double data entry does not have error (when checked) (1) Who does it • Visual checking is carried out by a person/user/manually//For double data entry, it is done by the computer (1) • For double data entry, the user is only involved if an issue is found (1) Speed • Double data entry is a slower process (accept converse) (1) General • For visual checking, the data is only entered once//for double data entry the data must be entered twice (1) • For double data entry, a second copy is temporarily created (1)	4	

Question	Answer	Marks	Guidance
4(b)	THREE marks available for ONE identified method and suitable description - Parity check (1st) Counts the numbers of 1s in (each byte) of data and adds a 1 if it is an uneven number/adds a zero if it is an even number (1) Reports an issue if the recalculated number does not match the original//if the recalculated value matches the original there is no issue with the transfer (1) - Checksum (1st) Uses a hash function (1) Counts the number of bytes/bits in a file//takes file size and produces a number (1) Concept of recalculating and checking again (1) Reports an issue if the recalculated number does not match the original//if the recalculated value matches the original there is no issue with the transfer (1) - Hash total//hash sum (1st) A number is calculated from the content of each field of data. (1) Concept of recalculating and checking again (1) Reports an issue if the recalculated number does not match the original//if the recalculated value matches the original there is no issue with the transfer (1) - Control total (1st) A number is calculated from the fields holding numerical data. (1) Concept of recalculating and checking again (1) Reports an issue if the recalculated number does not match the original//if the recalculated value matches the original there is no issue with the transfer (1)	3	Do not accept: - Visual checking - Double data entry

Question	Answer	Marks	Guidance
5(a)	FOUR from: STRUCTURE - In a flat-file database, there will be one table// in a relational database there will be more than one table (1) ACCURACY (accept converse for each) - A relational database is less likely to have data entry errors (1) (For the same data,) a relational database will be smaller//save storage space (1) THE DATA - A relational database will have less duplicated data/redundant data (1) OR - a flat-file database can have the same data repeated (many times)//have lots of redundancy (1) - Each record in a relational database only has to be entered once//in a flat-file database, the same data must be entered every time it is needed (1) - Any mention of data integrity being applied to a relational database (1) TIME (accept converse for each) - Relational databases take less time to maintain/edit the data (1) - Relational database takes longer to edit the structure (1) - Querying a relational database is faster than querying a flat-file databases (1) COMPLEXITY (do not accept converse) - Relational database is more complex (1) CAN ALSO AWARD IF STATED SEPARATELY - Relational database can create complex queries (1) - Relational database can create complex reports (1)	4	Do Not accept - Less time/more time to plan/make - Easier to create/update - Any reference to files rather than tables

Question	Answer	Marks	Guidance
5(b)	Three marks available: Structure: - Identifies the validation type (1st) - Describes a rule (1) - States why it is important//why is it used//what error does it stop (1) e.g. - Presence check (1st) Each field has to contain an item of data//cannot be left empty (1) To check that data has been entered into the field//because the data is necessary (1)	3	

Question	Answer	Marks	Guidance
6(a)	Eight from: • Means does not use a (real) helicopter (1st) avoids wear and tear//maintenance costs on the helicopter (1) • Simulations copy the real world (1st) • So, pilots can experience relatively rare/dangerous (1) A range of real-life situations (1) Which may not otherwise occur//may have to wait for (1) <u>For dangerous ONLY and if safety not already awarded</u> – “avoids the risk” (1) • Concept of injury being avoided (1st) Therefore, the simulation is safer (1) • The running cost of a simulation is less than the running cost of a helicopter (1st) And so, money is saved//is a cost-effective solution/is cheaper (1) • It replicates the experience of being in a real/different helicopter (1st) by having the same layout/controls (as a real helicopter) (1) • The replacement cost of a (crashed) helicopter exceeds the cost of a simulation (1st) Therefore, money is saved by training on a simulator (1) • Simulations can repeat scenarios (1st) So, the trainee pilot can master key skills//learn from their mistakes (1) • Small changes can be made to the scenario (1st) To allow the pilot to practice in changing conditions (1) • Different locations can be trained for (1st) Without the need to go there (1) • Pilots can train on their own in the simulator (1st) So, no need for a trainer to be present (1) More lessons can take place (at the same time) (1) • Lesson can be saved (1st) And content analysed afterwards (1) MAX six marks if the candidate only gives first mark answers.	8	

Question	Answer	Marks	Guidance
6(b)	TWO marks available for an explanation of an identified disadvantage: • Pilot may have a false sense of security (1st) And so take more risks in a real helicopter (1) • Simulator does not risk anyone's life, but a real flight does (1st) So pilot may freeze when faced with really being in charge (1) • Concept that may not be totally accurate or (fully) represent real life or realistic (1st) Therefore not a value practice (1) May not inspire//give confidence in the real world (1) Cause problems when they experience things that were not practiced (1)	2	ONLY mark first drawback given/attempted Do Not Award • Training is inefficient – TV • Isn't up in the air • The pilot could get scared on a real flight • Is a less pressured experience (TV) • A simulation is not training on real life (as in, it is a simulation, not the real thing). This is different to “a simulation may not be realistic”. • It doesn't feel like flying a helicopter

Question	Answer	Marks	Guidance
7(a)	TWO from: - Knowledge base editor (1st) allows the engineer to update the knowledge base (1) allows the engineer to edit the rules base (1) - Knowledge base (1st) stores all the facts/information (1) stores the rules base (1) - Inference engine (1st) Applies logic (1) Uses IF THEN reasoning (1) (Uses reasoning to) identify possible solutions/conclusion (1) Uses forward chaining/backward chaining (1) - Rules base (1st) Contains the IFTHEN reasoning (that is relevant to the expert system) (1) - Contains the FORWARD/BACKWARD chaining to reach a solution/conclusion (1) Contains the rules that the expert system uses to draw conclusions (1)	4	Do Not Accept: - User interface systems - Explanation systems

Question	Answer	Marks	Guidance
7(b)	EIGHT marks available: The final decision to follow the advice given by the expert system rests with the mechanic (this may be presented as a positive or a negative aspect) (1) Benefits Max 6: e.g. • Provides a consistent analysis (1) • Knowledge is based on input from a range of experts (1st) therefore is based on people who have solved similar issues (1) ONE FROM as (1st) Uses a process of reasoning based on facts and rules Uses what-if analysis Uses IF THEN analysis so there is a structured process of reasoning (1) • Produces a range of possible solutions (awareness of more than one) (1st) based on answers to a set of questions (1) • Provides full coverage//covers all areas/issues (1) • Includes areas about which the mechanic does not know a great deal (1) • Provides an explanation for decisions (1st) therefore the mechanic can learn (1) • Available at all times (1st) therefore do not need to contact another mechanic at an inconvenient time (1) Drawbacks Max 6: e.g. • Can only deal with problems that are recorded in the expert system (1st) therefore anything outside of the scope/experience of the experts/knowledge base cannot be dealt with (1) • May need to create a new expert system//update current expert system (1) As new cars/engines come onto the market//new technology is used in cars (1)	8	

Question	Answer	Marks	Guidance
7(b)	<u>If questions are badly structured</u>, will not have all the information needed to solve the problem (1st) therefore suggested solutions may be irrelevant/damage the car further (1) Conclusion (may only be awarded if positives(s) and/or negatives are included) - One mark for a value judgement/conclusion after the discussion of at least two arguments (1)		

Question	Answer	Marks	Guidance
8	FOUR from: Batch processing • All processing is done at the same time//processing is a single process//all at once (1) • Done at a fixed time (1) • Likely to be at the end of the day/when the supermarket has closed (1) • No action occurs until sometime after the sale (1) Real time processing • Real-time processing is done immediately (1) • As soon as an item is sold (1) • Supermarkets can order immediately stock levels become low//allows just in time stock control (1) General • Information for real-time processing is (more) up to date (1) • If the supermarket does not sell out before the close each day, both methods are equally effective (1) • If the supermarket sells out before the close each day, real-time processing allows items to be ordered immediately (and restocked that day) (1) • Errors are not identified immediately with batch processing (accept converse) (1) • Data may be lost (between sale and processing) for batch processing//data is less likely to be lost (1)	4	Accept converse arguments for the general section ONLY

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Question	Answer	Marks	Guidance
9(a)	ONE mark available: • Software that helps to manage/maintain/optimise a computer system (1)	1	
9(b)	ONE mark available: • Back-up software (1) • Encryption software (1) • Disk checking software (1)	1	