

Cambridge International AS & A Level

INFORMATION TECHNOLOGY**9626/13**

Paper 1 Theory

May/June 2024**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.

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This document consists of **9** printed pages.

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.

| Question | Answer | Marks |
|-----------------|-----------------------------------------------------------|--------------|
| 1(a) | • Cust_ID (1) | 1 |
| 1(b) | • Order_code (1) | 1 |
| 1(c) | One from: • Cust_ID (1) • Product_ID (1) | 1 |
| 1(d) | • One to many//one CUSTOMER to many ORDER(s) (1) | 1 |

| Question | Answer | Marks |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 2(a) | Four from: • Uses a fake website/illegitimate website/website pretends to be real (1) • Installs a piece of software/code on user's computer (1st) • unintentionally/unknowingly/without consent (1) • Software corrupts the host(s) file (1st) • by adding URLs and corresponding IP addresses (1) • User thinks they are on a genuine//non fraud website (1st) • customer types in the response to question (1). | 4 |
| 2(b) | Four from: • Involves using text/SMS messages (1) • The message may invite the receiver to click a link (1st) • looks just like the/an actual company's website (1) • but is a fake website (1) • The message may invite the receiver to phone a telephone number (1st) • that connects to an automated voice response system (1) • The smishing message usually contains something that demands the target's immediate attention (award exemplification) (1) • User thinks they are on a genuine//non fraud website (1st) • customer types in the response to question (1). (accept phone call equivalent) | 4 |

| Question | Answer | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3 | <p>Six from:</p> <p>Forward chaining MAX FIVE</p> <ul style="list-style-type: none"> • Forward chaining starts with/uses the data (1) • Uses inference rules to extract more data. (1st) • until a goal is reached (1) • An inference engine searches until it finds an IF statement known to be true (1) • The inference engine uses the ‘THEN’ part of the IF THEN statement to cause the addition of new information (1) • Inference engines will iterate through this process (1st) • until a goal is reached (1) • This method is called data-driven (1) <p>Backward chaining MAX FIVE</p> <ul style="list-style-type: none"> • Backward chaining starts with/uses a list of goals/hypotheses (1) • Uses inference engine to search for data that fits a goal/hypothesis (1) • An inference engine searches until it finds a THEN part that matches a desired goal (1) • If the IF part of that rule is not known to be true (1st) • then it is added to the list of goals (1) • This method is called goal-driven (1) | 6 |

| Question | Answer | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 4 | <p>Four from:</p> <p>Max two for each:</p> <p><i>Absolute:</i></p> <ul style="list-style-type: none"> • Always copies the same cell reference without modification when replicated/a fixed reference to a cell (1) • Any example of an absolute value/formula/source cell not changing (1) <p><i>Relative:</i></p> <ul style="list-style-type: none"> • It copies the cell reference, but will increment the cell reference when replicated//cell reference changes as the formula location changes (1) • Any example of a relative value/formula/source cell changing (1) | 4 |

| Question | Answer | Marks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 5 | <p>Six available.</p> <p>First mark : Describes the type of check and the data that is being checked (student ID or Student examination score).</p> <p>Dependant mark: Candidate states why inaccurate data could still be entered.</p> <p>Three matched pairs from:</p> <ul style="list-style-type: none"> • Length check on student number (1st) <p>ONE OF</p> <ul style="list-style-type: none"> • won't identify if the number is wrong (1) • Won't check invalid characters//or example (1) • Won't check if value is unique (1) • Invalid character/Type check on either (1st) <p>ONE OF</p> <ul style="list-style-type: none"> • Type check on student number won't trap fewer/more than 10 digits (1) • Type check on exam mark might still allow abnormal data to be entered (1) • Won't identify if the number is wrong (1) • Won't check if value is unique (1) • Range check on either (1st) <p>ONE OF</p> <ul style="list-style-type: none"> • Range check will only check the number is in range//will not check if number incorrect (1) • Won't identify if the number is wrong (1) • Limit check on either (1st) <p>ONE OF</p> <ul style="list-style-type: none"> • Range check will only check the number is below a higher number//will not check if number incorrect (1) • Range check only checks for exceeding the maximum value/score (1) • Won't identify if the number is wrong (1) • Check digit on student number (1st) • won't identify if the number is wrong (1) | 6 |

| Question | Answer | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 6(a) | <p>Six from:</p> <ul style="list-style-type: none"> • Sensor used to gather data (1) • Identifies ONE suitable sensor for collecting information on presence OR absence of pollution (1) • Data collected is analogue (any awareness) (1) • Analogue to Digital Convertor converts data to digital (1st) • So can be used/understood by the computer (1) • Computer analyses/processes data (1) • Results presenting in appropriate format/tables/graphs/charts (1) | 6 |

| Question | Answer | Marks |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 6(b) | <p>Eight from:</p> <p>Advantages MAX SIX:</p> <ul style="list-style-type: none"> • Data is continually monitored//no reason for monitoring not to occur (may exemplify) (1st) • if an event happens it should not be missed (1) • Computer systems can monitor multiple sensors simultaneously (1) • The logged data is already in electronic form (1st) • no transcription errors/no human error (1) • Does not need to be entered/typed in (1st) • which saves time (1) • Personnel can do other useful tasks (1) • Data is immediately sent to the computer (1st) • The data can be displayed immediately/in real time (1) • The data can be analysed immediately/in real time (1) • Can monitor 24/7 (1) • No risk to humans/equivalent answer (1) • Can be monitored remotely (1) <p>Disadvantages MAX SIX:</p> <ul style="list-style-type: none"> • Any interruptions to the power supply could cause sensor to stop working//collection of data to be missed/not happen (1) • Any damage/failure of the equipment could cause collection of data to be missed/not happen/be inaccurate (1) • The maintenance of equipment can be expensive/dangerous/time consuming//requires expertise/training. (1) • Data logger can not react to emergencies//unusual circumstances (1) | 8 |

| Question | Answer | Marks |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 7 | <p>Eight from:</p> <p>Example of program flowchart</p> <pre> graph TD Start([Start]) --> Input[/INPUT Mark/] Input --> Decision1{Mark < 85?} Decision1 -- Yes --> PrintA[/PRINT "Grade A"/] PrintA --> Stop([Stop]) Decision1 -- No --> Decision2{Mark < 70?} Decision2 -- Yes --> PrintB[/PRINT "Grade B"/] PrintB --> Stop Decision2 -- No --> PrintC[/PRINT "Grade C"/] PrintC --> Stop </pre> | 8 |
| 1 | START and STOP terminators | 1 mark |
| 2 | Input Mark | 1 mark |
| 3 | A, B and C grade decisions logically correct (check order) | 2 marks |
| OR | | |
| 4 | Two of A,B or C decisions logically correct (check order) | 1 mark |
| 5 | All decision box used have Yes and No | 1 mark |
| 5 | A, B and C grades output from relevant logic | 1 mark |
| 6 | U Grade output from correct logic AND correct yes/no decision | 1 mark |
| 7 | All flow lines correctly located | 1 mark |
| 8 | All lines have arrow heads with direction of flow | 1 mark |
| 9 | All correct symbols/shapes | 1 mark |

| Question | Answer | Marks |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 8(a) | <p>Two marks available for a full explanation:</p> <ul style="list-style-type: none"> • To identify the people involved in the creation of the video (1) so they can get recognition//acknowledge their role in creating it (1) | 2 |
| 8(b) | <p>Two from:</p> <ul style="list-style-type: none"> • A frame from the video to be used as a photograph/thumb nail (1) used for (e.g.) marketing/publicity//to check for continuity//to be used as an icon (1) | 2 |
| 8(c) | <p>Two from:</p> <ul style="list-style-type: none"> • Not all devices/platforms are able to play videos in all formats/the original format (1) • which means some videos are incompatible with specific devices/platforms • so this makes the video able to play/be accessed/used on a wider range of devices/platforms (1) • Videos may need to be converted to reduce their file size (1st) • to allow them to be attached to an email (1) • reduce storage space (1) • upload to video streaming website/social media (1) | 2 |

| Question | Answer | Marks |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 9 | <p>Six from:</p> <ul style="list-style-type: none"> • Sensor identifies approach/presence of vehicle (1) • Identifies ONE suitable sensor (Induction loop/pressure sensor/light sensor) (1) • Microprocessor registers presence of vehicle (1) • Microprocessor checks if barrier is raised/lowered (1) • If barrier down it needs to be raised (1) • Microprocessor sends a signal to an actuator/motor (1st) • which then raises the barrier (1) • If barrier up microprocessor does nothing (1) (if mark not awarded for MP 5, a mark may be awarded for “If barrier up”) • Computer checks to see whether vehicle is present/has gone (1) and if vehicle not detected then the barrier comes down (1) | 6 |

| Question | Answer | Marks |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 10 | <p>Eight from:</p> <ul style="list-style-type: none"> • CSV means comma separated value (1) <p><i>Benefits MAX SIX:</i></p> <p>e.g.</p> <ul style="list-style-type: none"> • csv is human readable (1) • can be edited in a text editor (1) • csv is processed by multiple//almost all applications (1) • csv is small in file size//takes up little storage space (1) <p><i>Drawbacks MAX SIX:</i></p> <p>e.g.</p> <ul style="list-style-type: none"> • csv includes data/values only (1) • Does not include formatting (1) • There is no distinction between text and numeric values (1) • No standard way to represent binary data (1) • Problems with importing csv into SQL (no distinction between NULL and quotes) (1) • Poor support of special characters (1) • No standard way to represent control characters (1) • Lack of universal standard. (1) | 8 |