



# Cambridge International AS & A Level

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INFORMATION TECHNOLOGY

9626/11

Paper 1 Theory

May/June 2022

MARK SCHEME

Maximum Mark: 70

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**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 2022 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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 descriptors 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	<p><b>Four from:</b></p> <p>It is collecting the data and then processing it/processing it all in one go/all at once / stored until the system comes online to process the data in one 'batch'</p> <p>The customer purchases/repayments/orders are collected into batches and each batch/orders are processed as a whole</p> <p>Customer orders processed when the computing resources are less busy</p> <p>Batches/orders can be stored up during working hours and then executed/processed during the evening/weekend</p> <p>Transaction file is used to update master file</p> <p>Transaction file of customer purchases/orders is kept for later processing – weekly/monthly</p> <p>Master file of customer details is only updated weekly/monthly</p> <p>Transaction file is used with master file to produce customer orders at the end of the month</p>	4

Question	Answer	Marks
2	<p><b>Four from:</b></p> <p>Simulates difficult situations/take off scenarios/speed of the aircraft/turbulence/different/extreme weather conditions/can control weather conditions</p> <p>Include software and specialised equipment/hardware...</p> <p>...that can cost hundreds of thousands of pounds...</p> <p>...a cabin containing screens, flight controls, control wheel, throttle, joystick, instrumentation, pilot seat, sound system, computer hardware, altitude gauges, fuel gauges (must have two)</p> <p>Software includes the rules of the model that define how the aircraft reacts...</p> <p>...includes a database containing information about each airport...</p> <p>...allowing pilots to practice landing at unfamiliar airports...</p> <p>Control panel in a cockpit mimics/is identical to one in a real plane/equipment is designed to react in a similar way to real aircraft</p> <p>Pilot uses joysticks/levers/switches/buttons/sliders to control movement/speed</p> <p>Displays are generated by computers on the screens in the cockpit/screens display runway/sky...</p> <p>...computer graphics produce display using...</p> <p>...projectors/back-projection screen/panoramic spherical mirror</p>	4

Question	Answer	Marks
3	<p><b>Eight</b> from:</p> <p>Encryption is the scrambling of data...            ...it converts plaintext to ciphertext...            ...into meaningless groups of symbols...            ... can't be understood by unauthorised people/read without the decryption key...            ...without encryption messages can be stored as plain text, making it easy for anyone to read and understand            Encryption keeps personal data secure...            ... such as credit card numbers and personal information from computer hackers            If personal information is intercepted, but it can't be understood, it is of no use...            ... the act of hacking in this case is pointless            It does not prevent hackers intercepting personal data but it prevents them from understanding it            Two types of encryption asymmetric and symmetric...            ...symmetric and asymmetric use a private key but asymmetric uses a public key as well /symmetric uses the same key to encrypt and decrypt but asymmetric uses different keys...            ...symmetric uses a private key to encrypt and decrypt /symmetric is where both sender and receiver use a private key...            ...asymmetric uses a public key to encrypt and a private key to decrypt /sender uses a public key and receiver uses a private key            Can only decrypt using a decryption key/only authorised users have the decryption key...            ... Symmetric is a faster method than asymmetric...            ... Symmetric is less secure than asymmetric            Data is encrypted using an encryption key</p> <p><b>Must be a proper analysis to gain full marks</b>  <b>Max. six marks if bullets/list of points</b>  <b>Must have expansions to be a proper analysis</b></p>	8

Question	Answer	Marks
4	<p><b>Seven</b> from:</p> <p>The computer searches for the bar code number 5022476130067 in the product file            When the matching record is found, the number in stock, 131, is reduced by one to 130            The number in stock, 130, is now compared with the re-order level, 130            If the number in stock is equal to the reorder level...            ... which it is, then the computer creates an order automatically            The computer reads the reorder quantity, 250, needed for the product            It reads the supplierID, B671841, for Oaters            It searches the supplier file for the record corresponding to the supplier ID, B671841, read from the Product file            The order/e-mail is automatically sent to the supplier...            ...using the supplier's contact details from the Supplier file, js@cmail.co.ke</p>	7

Question	Answer	Marks
5(a)	<p><b>Six</b> from:</p> <p>A is a track, B is a sector, C are read-write heads, D is a cylinder, E are surfaces, F is a platter (3 marks for all 6 correct, 2 marks 5 correct, 1 mark for 3 or 4 correct)</p> <p>A hard disk drive consists of several platters which are individual disks</p> <p>Each surface of a platter has its own read/write head</p> <p>The read/write heads move across the platters/surfaces stopping only to read <u>data</u> from or write <u>data</u> to the surface...</p> <p>... never touching a disk surface each of which is used to store data</p> <p>Each surface is divided into several tracks which are in the same position on each disk</p> <p>The track on the top platter together with the tracks exactly below it, form a cylinder</p> <p>Each track is divided into sectors</p>	<b>6</b>
5(b)	<p><b>Four</b> from:</p> <p>Organises the contents of the disk into the smallest number of contiguous regions/fragments...</p> <p>...by moving the data blocks of a file/defragmented files around to bring whole/all the parts of a file together</p> <p>Attempts to create larger regions of free space</p> <p>Some defragmentation utilities try to keep smaller files within a single directory together</p> <p>It is the rearranging of files stored on a disk</p> <p>The movement of the hard drive's read/write heads over different areas of the disk when accessing fragmented files is slower...</p> <p>...compared to accessing the entire contents of a non-fragmented file sequentially...</p> <p>...data retrieval is made easier and quicker</p>	<b>4</b>

Question	Answer	Marks
6	<p><b>Six from:</b></p> <pre> REPEAT   INPUT temperature   IF temperature &lt; preset     THEN       IF pump switched off         THEN           send signal to switch pump on         ENDIF       ELSE         IF pump switched on           THEN             send signal to switch pump off           ENDIF         ENDIF       UNTIL system switched off </pre> <p>1 mark for correct 1st IF statement  1 mark for correctly positioned first action  1 mark for correctly positioned 1st ENDIF  1 mark for correct 2nd IF statement  1 mark for correctly positioned second action  1 mark for correctly positioned 2nd ENDIF  1 mark for correctly positioned 3rd ENDIF  1 mark for correct UNTIL statement...  ...1 for correct position of correct UNTIL statement</p>	6

Question	Answer	Marks
7	<p><b>Six from:</b></p> <p>Replication/copying means you don't have to enter the same formula/data several times/the rules of a model can be changed easily using replication  Absolute and/or relative cell referencing makes sure you only increment the parts of a formula you need to when replicating a formula  Allows what-if questions to be asked  Cell protection makes sure that the cells you want do not change by accident  User interface forms makes it easier to input values into the model  Conditional formatting allows you to highlight certain values that match specific criteria  Graphs/charts to show trends/predictions  The use of input forms makes it easy to enter data  Macros make it easier to create more complex formulae or functions/used to record a sequence of actions  Goalseek can be used to determine which variables need to be changed to achieve a target or goal  Pre-written functions allow users to create complex formulae  Values can be changed to ask whatif questions</p>	6

Question	Answer	Marks
8	<p><b>Eight from:</b></p> <p><i>Advantages</i>            It may allow a larger set of data to be examined...            ...direct data gathering could have limitations due to the availability of the people being interviewed...            ...using banks the sample could be increased giving rise to greater confidence in the findings            Information can be of a higher quality as banking data will have already been collated and grouped into meaningful categories            Joanne does not have to read through poorly written responses to questionnaires/her interview transcripts...            ...to create the data source</p> <p><i>Disadvantages</i>            It may cost a lot of money to pay the banks to obtain the data...            ... whereas people who are questioned will not need to be paid            The various purposes for which data was collected originally may be different to the purpose of the current study...            ... there may be much more data than needed...            ...unnecessary data may need to be filtered out            There may be <u>sampling</u> bias            There may be coding difficulties ...            ...different banks being used means there will be differences in the content            ...there may be a lack of standardisation across the data required            ...different banks will have different amounts of data            If it has already been coded the coding may be difficult to understand</p> <p><b>Must have at least two of each to gain full marks</b>  <b>Must be a proper discussion to obtain full marks</b>  <b>Max. six marks if bullets/list of points</b>  <b>Must have expansions or comparisons to be a proper discussion</b></p>	8

Question	Answer	Marks
9	<p><b>Six from:</b></p> <p>Infrastructure for broadband is less developed in rural areas than in cities...  ...any existing infrastructure tends to use a lower level of technology making it difficult to install high speed broadband</p> <p>In rural areas people tend to be further away from a cabinet causing longer cables to be used leading to slower speeds</p> <p>Rural areas can have difficult terrain which make it difficult for companies to develop the infrastructure/lay fibre cables</p> <p>Rural parts tend to have a lower concentration of people/population so providers cannot recuperate costs quickly/less willing to invest in infrastructure</p> <p>More expensive for providers to offer services in rural areas and the extra costs are passed onto the customers</p> <p>Cities can have more providers competing to provide broadband than rural areas making it cheaper for the customer</p> <p>In rural areas people can use satellite broadband but it tends to be slower than cabled broadband connections</p> <p>Satellite broadband can be more expensive than cabled broadband connections</p> <p>Can use smartphones but signal quality depends on the number of towers and in rural areas there are fewer</p>	6

Question	Answer	Marks
10	<p><b>Six from:</b></p> <p>Temperature, light, turbidity, pH, O<sub>2</sub>, CO<sub>2</sub>, nitrite, nitrate (must have two)</p> <p>Place sensors in the river next to the farm</p> <p>The sensors would be connected to ADC/computer</p> <p>Sensors send data to analogue to digital convertor</p> <p>...enables the computer to understand the data</p> <p>Computer receives data from ADC</p> <p>Readings from sensors are compared with normal river values <u>by the computer</u></p> <p>Differences/results are printed out/displayed on screen</p> <p>Graphs are <u>automatically</u> produced by computer showing values from river and normal values</p> <p>Computer stores readings in a table/database/file/spreadsheet ready for further processing</p>	6



Question	Answer	Marks
11	<p><b>Five</b> from:</p> <p>Gestures may be a quicker way of initiating a response from a device People who have speech impediment can find a gesture based interface useful rather than dialogue Gestures will still be reliable if there is background noise or user has a cold/strong dialect/accent which would affect a dialogue interface Dialogue interface often requires a training session with user whereas gestures can be taught through manuals Users with physical handicaps may find it easier to make gestures rather than gripping a mouse Don't have to learn so many commands as with a CLI For reasons of hygiene doctors/health workers/restaurant chefs may not be allowed to touch a display or device using a GUI... ...appropriate gestures are a more hygienic way to control the device</p>	<b>5</b>