CAMBRIDGE
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Cambridge International AS & A Level

INFORMATION TECHNOLOGY **9626/13**

Paper 1 Theory **October/November 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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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.

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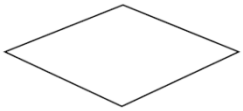
Question	Answer	Marks
1	**EIGHT** from: 1 mark for each correct symbol (1st mark) (max 4) 1 mark for each correct matching purpose stated (max 4) **Taken from syllabus:** **Purpose** / **Symbol** Input/output Decision  Terminator (Start/Stop) Process box Subroutine Connector Flow line	**8**

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Question	Answer	Marks
2	**SIX** from, e.g.: • MIS is a computer-based system that provides managers with the tools to organise/evaluate/efficiently manage departments within an organisation (1) • It provides past, present and prediction information (answer must include TWO from) (1) • It is software based (1) • It includes a database/databases (1) • It includes a number of decision support systems (1) • It can be used to produce reports (1) • Can produce graphs/charts (1)	**6**

Question	Answer	Marks
3(a)	**TWO** from: • A database is in 1NF (accept list of 1NF principles) (1) • All the non-key attributes depend entirely on the primary key/it has no partial dependencies. (1)	**2**
3(b)	**EIGHT** from, e.g.: ***Benefits MAX 6*** • Atomised data is easier to search **on specific criteria** (1) • Any change to one record which is needed can instantly be made to any related records//data editing is straightforward (1) • The database does not have redundant data (1) • File size is small/less storage needed (1) • There is no data duplication (1st) – so there are fewer errors in the data (1) – so there is less chance of storing incorrect copies of the data (1) ***Drawbacks MAX 6*** • It can take **longer** to set up the database (1) • It is a more complex database (1st) • due to the relationships between tables (1) • Making data atomic may not always be the best solution (1ST) • such as (E.G.) date of birth can be separated into day, month and year but this may serve no purpose • Has more/multiple tables (1) • therefore setting up queries/reports/input forms can become more difficult (1) • making it difficult to keep track of data (1) • May require greater expertise (which may need to be bought in) (1).	**8**

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Question	Answer	Marks
4(a)	**THREE** from: • Verification is checking that data that has been/is being entered into a computer has been **copied** correctly (1). • Validation is checking that the data entered is reasonable/sensible/valid/follows a set of rules. (1) • Verification will not pick up the fact that the original data might be incorrect. (1) • Validation can not tell if the data has been entered incorrectly (1) • Verification would pick up a transposition error. (1) • Verification would pick up a transcription error. (1)	**3**
4(b)(i)	**TWO** from: • It is a validation method (1) • It checks that data is possible/sensible for the context (1) • It checks that data is between an upper **and** lower acceptable value (1) • Sensible example (1)	**2**
4(b)(ii)	**TWO** from: • It is a verification method (1) • It is used to avoid/pick up transcription errors (1) • Two versions of the data are **entered** and **compared** (1st) – If a discrepancy between the two versions is found, user will be alerted (1) • Sensible example (1)	**2**

Question	Answer	Marks
5	**FOUR** from: • The public key is used to encrypt the data (1) • The private key is used to decrypt the data (1) • The public key is published to everyone (1) • The private key is sent separately to the receiver (1) • The private key is kept secret (1) • Anyone with a copy of the public key can encrypt information (1) • **Only** the private key holder can decrypt the information (1) • It is not possible to decrypt the data from the public key (1)	**4**

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Question	Answer	Marks
6	**THREE** from: • It will check the **contents of** cell B6 (any awareness that outcome is based **on contents of** B6) (1) • If the contents are **NOT less than 5** (1) OR **NOT greater than 8** (1) (accept converse) – **ONLY award following if both above stated (NB note effect if answer above is converse)** – The cell displays 4th Quarter (1) – if not/otherwise the cell displays a null string. (1) (Answer is dependant) OR • If condition not met, a blank cell is displayed (1)	**3**

Question	Answer	Marks
7	**FOUR** from: • It is used in backward chaining (1) • It starts with a goal/set of goals (1st) – which establish the rules to be followed (1) – to identify initial conditions (1) • Inference engine **uses** the rules base (1) – to find one which has a THEN part that matches a required goal (1) (Award once only) • Inference engine **explores** the rules (1st) – until it finds one which has a THEN part that matches a required goal (1) (Award once only) • If the IF part of that rule is known to be true (1st) – it is added to the list of goals. (1)	**4**

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Question	Answer	Marks
8	**EIGHT** from, e.g.: Award ANY description of differing access to Information Technology leading to digital divide. **ONE mark per description** e.g. • Access to fast broadband can be better for those people living in urban areas than for those living in rural areas (1) • The quality of connection to the internet may be poorer in underdeveloped countries (1) • Buying televisions/personal computers/smartphones can be more expensive in rural areas (1) • Richer people are more/poorer people less able to afford the latest versions of televisions/personal computers/smartphones computers (1) • Lower paid workers may not be able to afford the hardware to be able to access the IT (1) • Uneducated people are often not aware of IT/importance of IT/benefits of IT/possibilities of IT (1) • Young people have grown up with the technology/older people may feel they are too old/unwilling to learn about new technology (1) • Disabilities of some users may inhibit the use of smartphones/computers. (1)	**8**

Question	Answer	Marks
9(a)	**FOUR** from: • Spyware is software that is installed/operates on a computer without the user's knowledge (1st) – often the first indication is a noticeable reduction in processor speeds. (1) • Records/tracks what a user does on their computer (1) • Can gather information like e.g. web browsing habits (1) • Can capture email messages//a user's personal data/information (can exemplify) (1) • Transmits this data to a third party over the internet (1)	**4**
9(b)	**FOUR** from: • A program (1) that replicates itself (1st) – until it fills all of the storage space (on a drive or network) (1) • It searches for more computers (1) • Exploits security holes in networks (1) • Worms can slow down **a network** (1st) – by consuming bandwidth (1) • Worms often originate from email attachments (1) • Worms then spread to a user's contacts via their email account/address book. (1)	**4**

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Question	Answer	Marks
10	**EIGHT Marks available:** **Definition of online processing:** **ONE from:** • User is in **direct** connection with a **central** computer (1) • A **real time** relationship between user and seller **via the internet (1)** **Max EIGHT**: • Give a positive impact (1st) • Give an extension that is a positive implication on a customer or business of the identified justification. (1) e.g. • Speeds up the process of an individual order (1st) results in better customer satisfaction (1) **Other areas of focus** • Speeds up the process of a large number of orders • Allows online purchases • Allows online financial transactions • Helps to keep track of your stock levels • Continues to collect data, therefore more accurate • Reduces the time between ordering and delivery • Automated reordering • Integration with other online systems.	**8**

Question	Answer	Marks
11	**FOUR** from: • Calibration improves the accuracy of sensors after they have become inaccurate (1) • Can correct the sensor so original reading is accurate (1) • (OR) can apply an offset to take account of an inaccurate reading (1) • Only one measurement point is needed (1) • Appropriate for sensors that have to measure a single type of value/variable (1) • Does not need to be calibrated against any other range of parameters (1) • Often needed for sensors being used at extreme values (1) • Reading is taken (from the sensor) and compared with a known value (1st) – in the range being measured (1) • Sensor reading is subtracted from the known value (1st) – which gives the offset (1) • The algorithm uses the offset by adding it to every reading in the parameter range being measured. (1)	**4**

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