CAMBRIDGE
International Education

Cambridge International AS & A Level

INFORMATION TECHNOLOGY **9626/12**

Paper 1 Theory **February/March 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.

Cambridge International is publishing the mark schemes for the February/March 2024 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.

Question	Answer	Marks
1	**Six** available. • Spreadsheet software allows **what-if** analysis to be carried out (award any mention of what if analysis) **One** per instance of a **suitable** characteristic: e.g. • Can sort data **into a rank order** • Can protect cells from **accidental** change • User interface forms to **allow data input** • **Can use macros** which can create routines /subroutines • Macros/subroutines enable automation//can be executed by a button • Conditional formatting can show/highlight data that **matches//is greater than//less than criteria** • Lookup tables to store values • Automatic recalculation changes output **when new value inputted/data updated** • Allows values to input (in bulk) from an external source • Carries out calculations **such as subtraction** (accept any example of a calculation) • Formulae can be created for **calculations** • Functions can perform set tasks **in formulae** • Goal seek finds a suitable starting input for a desired output • Charts to present values//allow for comparison • Charts automatically update	**6**

Question	Answer	Marks
2	**Eight** available. Max **two** for each matched pair: • **Table** name/title (1st) …a **unique/meaningful** name for each table (in the database)//to give context (1) • **Field** name/title (1st) …a **unique/meaningful** name to identify each field//to give context (1) (Candidate may describe a meaningful name by example – e.g. 'full name to hold first and surname') • **Data** type (1st) …Such as (e.g.) integer/alphanumeric **Field** length/size (1st) …specify the number of characters (in each field) (1) • **Field** default value (1st) …the value automatically entered when a new record is created (1) • Description of each **field** (1st) …explanation of the content (of each field) (1) • Required/null **field** (1st) …whether a field can be left blank (1) • Validation (1st) …test to be applied to data that is entered (1) …to ensure data entered is sensible/reasonable (candidates may describe this instead of expressly stating it) (1) • Table security (1st) …who has access to edit (accept examples, such as write or delete) the table • Primary Keys/Foreign keys (1st) …to identify unique **records** (1) …to link tables (1) • Relationships (1st) …types of relationship between tables are stated (1)	**8**

Question	Answer	Marks
3	Max **six** overall. Max **two** for each **suitable** utility software. Description may be what the utility does, or how this is achieved, or the impact on optimum performance. e.g. **Device driver** (1st) e.g. …allows computer to interact with a device (1) …manages hardware components/peripherals (1) **Data compression tools** (1st) e.g. …to **free up storage** space (by compressing files)//reduce file size (1) **Anti-virus/anti-malware** (1st) e.g. …**checks for/DETECTS** malicious software (1) …**prevents viruses** from being downloaded (1) …**quarantines** any virus it finds (1) …Stops your computer from being infected by a virus (1) **File management tools** (do not accept examples as first mark) (1st) e.g. …to organise directories (1) …delete unnecessary/unused files (1) **Searching** (1st) e.g. …to find file duplication (1) …to find files by name or another criterion (1) **(Disk) defragmentation** (1st) e..g. …reassemble files into (contiguous) clusters (1) …files are able to be opened more quickly (1) **Create/resize (logical) volumes** (1st) e.g. …the organisation of disk structure (1)	**6**

Question	Answer	Marks
4(a)	**Four** from: • Computers deal with each input and give (almost) **immediate/real time responses**//Booking is processed in **real time/(almost) immediately** • Online processing deals with one transaction **at a time** • **Once the transaction has taken place** the database will be updated immediately/same time as the booking • **Once booked** seat is shown as booked • **Once the transaction has taken place** the computer sends a message/ticket to the user to inform him/her the seat has been booked	**4**
4(b)	**Two** from: • Flight won't be overbooked • Duplicate tickets will not be issued/ Seat cannot be booked by anyone else • Guaranteed that will be on the flight • Customers know immediately if they have successfully booked a seat//get immediate confirmation//get immediate advice if there is an issue • Seat is held as yours for a period of time//have time to think about whether to go ahead	**2**

Question	Answer	Marks
5	**Six** from: • The required temperature is **set by the user** • The required temperature is input using a remote control/touchscreen /number pad • A sensor is used to read/gather/monitor the (current) temperature • The data collected by the sensor is **analogue** (shows **clear** awareness that original data is analogue) • The data is **converted to digital** via an **ADC** • **Microprocessor** compares this data/temperature to the required/input value (this must be stated and not implied) • If temperature is, nothing happens • If the data is different than the required value, the **microprocessor** sends a signal … (1st) – …to the actuator (1) • **If lower**, the microprocessor/actuator switches the heater **on** • **If higher**, then the microprocessor/actuator switches the heater **off** • Process is **constantly repeated**	**6**

Question	Answer	Marks
6	**Six** from: • A CLI is one where the user interacts by **typing text** commands • Users with physical disabilities may find CLI hard to use (1) as not able to use a keyboard (1) • Instructions have to be learned/memorised • CLI commands are complicated • CLI commands need specific structure • If the syntax is incorrect there maybe unforeseen circumstances//will not work • Increases possibility of human error • A slower way of initiating a response from a device • CLI commands may be processed more quickly (once typed in) • CLI uses less memory than other interfaces • Requires specific training • Does not allow multiple windows/multitasking • More flexible	**6**

Question	Answer	Marks
7(a)	**Three** from: • The software is available now//any awareness that software is more readily available • They can choose between different manufacturers of software • The software is more likely to have been fully tested • Less likely to have errors in the code • More support available from books/manuals/ company staff/user groups • The **development** cost of the software is spread between multiple customers • Off-the-shelf software tends to be cheaper **than custom written** software • Updates/patches to the software can be **more** frequent/often/regular	**3**
7(b)	**Three** from: • The software is more likely to be written to work with the existing software • The software is more likely to be written to work with the existing hardware • Can get (direct) support from **the developer** • The evolution of the software meets changing circumstances within RockICT • Can be written so that less computer resources are used • **Only** includes the required features • RockICT will own the software and could legally sell it on to others • RockICT has more control of the writing of the software • RockICT will be able to specify exactly what it wants/fulfil the exact purpose for which it has been created.	**3**

Question	Answer	Marks
8	**Six** available: • These methods/verification and validation **on their own/when not used together** do not ensure that the data entered is (fully) accurate/correct • Example of both validation and verification in use to achieve accuracy, with clear explanation of why **both** are needed. Max **five** from: • Verification is checking that data that has been/is being entered into a • computer has been copied correctly (from the data source)//correctly entered • Validation is checking that the data entered is reasonable/sensible/follows a set of rules • Although verification helps to stop users from making mistakes when • entering data, it cannot check that the data was originally correct • Validation is needed because although the data might be copied correctly, the original data might be invalid • Therefore, both are needed to make sure that the data is both **correctly copied** and **valid** • Valid example of validation technique that could be applied (must be identified as an example of validation) • Valid example of verification technique that could be applied (must be identified as an example of verification)	**6**

Question	Answer	Marks
9	**Seven** from: One mark for a description of encryption (e.g. data scrambled/converted to cyphertext) ***Benefits*** Max **six** from**:** • Encryption makes data unable to be understood/accessed (1st) – for third parties// unauthorised people//people who don't have a decryption key (1) – and so is of no use (1) • Reduces the motivation for interception (1st) – Because data is protected (1) • Allows **confidential/sensitive** information to be transferred/shared/included in emails (accept converse argument about absence of encryption) • Enables IT departments/businesses to comply with data protection regulations ***Drawbacks*** Max **six** from**:** • Hackers can **still** intercept emails (1st) …data can still be lost (1) • Encryption/decryption/private key must be transferred between sender and receiver • Anyone with the key can understand the email (1st) …so gives the intended user a false sense of security (1) • If the same key is used repeatedly there is a security issue • Managing digital certificates can become complex and time consuming • Requires more computer processing power • It takes **longer** to **transmit** encrypted data • It takes **longe**r to **open/decrypt** encrypted data	**7**
10(a)	**Two** available: • The **number of samples** (1st) – within a given period of time (accept ANY time unit) (1) – usually within 1 second (1).	**2**
10(b)	Max **two** for **one complete** explanation: • The sampling rate can affect the quality of audio files/how the audio sounds (1st) – because it captures sounds at discrete points (and not the whole sound) (1) • A higher sampling rate sounds **better than** a lower rate (1st) – because a higher sampling rate more accurately represents the original sound (1) • The lower the sample rate, the smaller the file size (1st) – because there is less data stored (1)	**2**

Question	Answer	Marks
11	**Three** from: • It is a format for storing (digital) data • Defined by a publicly published specification • Specification maintained by a standards organisation • Can be used and implemented by anyone • An open-source file format can be used by both proprietary **AND** free/open-source software • Also called free file formats if they are not covered by any copyrights/patents • They can be used at no monetary cost (for any desired purpose). • Example of open-source format (CSV/TXT/JPG)	**3**
12	**Six** available. **One** for a definition of the digital divide: • The digital divide is the gap between those who have access to//use technology and those who do not Max **six** from: • In this case, the gap is caused by differing levels of knowledge about what technology is available (1) AND differing levels of knowledge about what technology can achieve//benefits to be gained (1) • Not everyone is able to keep up with/keep aware of the constant changes in technology • A person who is unaware of what is available//what can be achieved will not use //not know how to use technology • A person who is aware of what is available//what can be achieved will use technology • Increased digital awareness leads to increased/better infrastructure// more investment in IT (accept personal equivalences) (1) which then leads to increased digital awareness (1) (accept reverse argument for digital unawareness) • **This divide may be reduced** by education/research/experience • This divide may exist within any socioeconomic bracket • This divide may exist within any age group.	**6**

