Cambridge Assessment International Education

Cambridge O Level

COMPUTER SCIENCE **2210/11**

Paper 1 Computer Systems **May/June 2023**

MARK SCHEME

Maximum Mark: 75

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 2023 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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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.

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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.

Mark scheme abbreviations

/	separates alternative words / phrases within a marking point
//	separates alternative answers within a marking point
underline	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be awarded
( )	the word / phrase in brackets is not required, but sets the context

Note: No marks are awarded for using brand names of software packages or hardware.

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Question	Answer	Marks
1(a)	• B	**1**
1(b)	**One** mark per each correct conversion • 00110010 • 01100110 • 11011101	**3**
1(c)	**One** mark for full method of working e.g. conversion to binary then flipping and adding 1 **One** mark for correct answer • 10110010	**2**
1(d)	**One** marks per each correct nibble **One** mark for correct working in binary (showing 4 correct carries) 1 1 1 1 0 0 1 1 0 0 1 1 0 1 1 0 0 0 0 1 10 0 1 0 1 0 0	**3**
1(e)	**Two** from: • The result of the calculation is greater than 255 // The value generated is larger than can be stored in the register • The result of the calculation would require more than **8 bits** to be represented // A **register** has a predetermined **number of bits** and there are **too many bits** for it	**2**

Question	Answer	Marks
2(a)	**One** mark for each correct definition: • The sample rate is the number of samples taken in a second/per time unit • The sample resolution is the number of bits per sample	**2**
2(b)	• Lossy compression	**1**
2(c)(i)	Any **two** from: e.g. • Destination/receivers (IP) address • Packet number • Originator's/senders (IP) address	**2**
2(c)(ii)	Any **five** from: • Data is **broken**/**split/divided** into packets • Each packet (could) take a different route • A **router** controls the route/path a packet takes • … selecting the **shortest/fastest** available route/path • Packets may arrive out of order • Once the **last packet** has **arrived**, packets are **reordered** • If a packet is missing/corrupted, it is requested again	**5**

Question	Answer	Marks
3(a)	**One** mark for each correctly circled storage device: • Compact disk (CD) • Solid-state drive (SSD) • Hard disk drive (HDD)	**3**
3(b)	• C	**1**

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Question	Answer	Marks
4	**One** mark for each correct term in the correct place: • System • Application • Operating • Hardware	**4**

Question	Answer	Marks
5(a)	Any **one** from: • Level • Pressure • Moisture	**1**
5(b)	Any **Six** from: • Sensor **continually** sends **digitised** data to microprocessor • Microprocessor compares data to stored value(s) • If value is outside range / matches microprocessor sends **signal** to release water to refill water bowl • … bowl filled by set amount // bowl filled for certain time • Actuator used to release water • Whole process repeats **until turned off/stopped**	**6**

Question	Answer	Marks
6(a)(i)	• Network interface card/controller // NIC // WNIC	**1**
6(a)(ii)	• Media access control/MAC address // MAC	**1**
6(b)(i)	• Router	**1**
6(b)(ii)	**Three** from: • It can be used to **uniquely identify** a device (on a network) • It can change … • … each time the device is connected to the network	**3**

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Question	Answer	Marks
7(a)	Any **two** from: • Close to the language processed by computers • May use mnemonics • An example is assembly language/machine code	**2**
7(b)	Any **two** from: • Can directly manipulate the hardware • No requirement for the program to be portable • Program will be more **memory efficient** • No requirement for a compiler/interpreter • Quicker to execute • Can use specialised hardware	**2**

Question	Answer	Marks
8(a)	**Three** from: • Trial and error to **guess** a **password** • **Combinations** are repeatedly entered … • … until correct password is found • Can be carried out manually or automatically by software	**3**
8(b)(i)	Any **two** from: e.g. • Steal/view/access data • Delete data • Change data • Lock account // Encrypt data • Damage reputation of a business	**2**

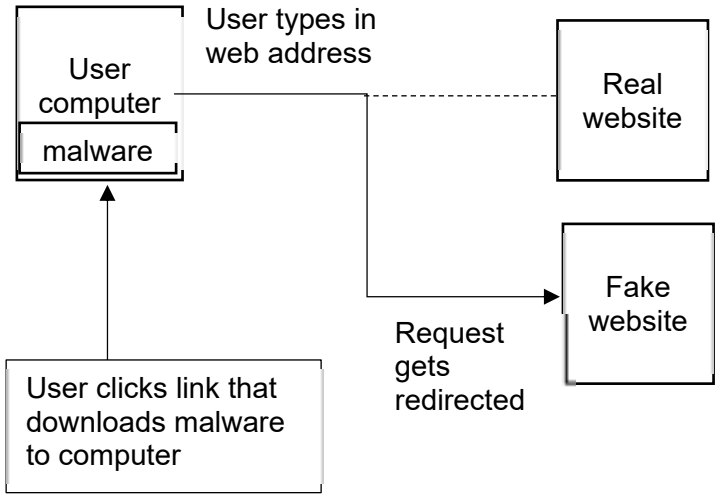
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Question	Answer	Marks
8(b)(ii)	Any **three** from: e.g. • Virus • Worm • Trojan horse • Spyware • Adware • Ransomware	**3**
8(c)	Any **two** from: • Two-step verification//Two-factor authentication//by example • Biometrics • Firewall // Proxy-server • **Strong/complex** password // by example • Setting a limit for login attempts • Drop-down boxes • Request for partial entry of password	**2**

Question	Answer	Marks
9(a)	Any **two** from: • It has a **mechanical** structure/framework • It has **electrical** components // by example	**2**
9(b)	Any **two** from: e.g. • Employees don’t need to lift heavy furniture • Employees can be protected from dangerous tasks • Employees can utilise their skills in other tasks • Employees don’t need to perform repetitive/mundane tasks	**2**

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Question	Answer	Marks
9(c)	Any **one** from: e.g. • Expensive to **install/purchase/setup** • High ongoing costs/maintenance costs • May deskill the workforce • If they malfunction, production may stop	**1**

Question	Answer	Marks
10(a)	• To obtain **personal** data/details // by example	**1**
10(b)	**One** mark for each correct part of the diagram. Diagram shows: • User clicks/opens attachment/link that triggers download • Malicious software downloaded onto user's computer • User enters website address • User is **redirected** to fake website e.g.  	**4**

Question	Answer	Marks
10(c)	**Two** from: Displays web pages … by rendering HTML	**2**
10(d)	Any **three** from: e.g. • Storing bookmarks/favourites • Recording user history • Allowing use of multiple tabs • Providing navigation tools // by example • Providing an address bar • Managing protocols // by example // checking digital certificate • Send URL to DNS • Sends a request to the **IP address/web server** (to obtain the contents of a webpage) • Runs active script/JavaScript/client-side script • Allows **files** to be downloaded from **website/internet**	**3**
10(e)	Any **four** from: • Session cookies are stored in memory/RAM • … whereas persistent cookies are stored on the hard drive/secondary storage • When the browser is closed a session cookie is lost • … whereas a persistent cookie is not lost • … until deleted by the user/they expire	**4**

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