Cambridge Assessment International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/11**

Paper 1 Theory **May/June 2022**

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

This document consists of **13** printed pages.

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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.

Please note the following further points:

The words in **bold** in the mark scheme are important text that needs to be present, or some notion of it needs to be present. It does not have to be the exact word, but something close to the meaning.

If a word is underlined, this **exact** word must be present.

A single forward slash means this is an alternative word. A double forward slash means that this is an alternative mark point.

Ellipsis (…) on the end of one-mark point and the start of the next means that the candidate **cannot** get the second mark point without being awarded the first one. If a mark point has an ellipsis at the beginning, but there is no ellipsis on the mark point before it, then this is just a follow-on sentence and **can** be awarded **without** the previous mark point.

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Question	Answer	Marks
1(a)(i)	• Sound	**1**
1(a)(ii)	• Lossy compressed file	**1**

Question	Answer	Marks
2(a)(i)	• Random access memory // RAM	**1**
2(a)(ii)	**One** mark for each correct stage Second stage • Decode Third stage • Execute	**2**
2(a)(iii)	Any **two** from: • Memory address register // MAR • Memory data register //MDR • Program counter // PC • Control unit // CU • Address bus • Data bus • Control bus	**2**

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Question	Answer	Marks
3(a)	Any **one** from e.g.: • SD card • USB flash memory drive • Random access memory // RAM	**1**
3(b)	Any **three** from: • Laser is shone at the disk • An (arm/head) moves the **laser** across the surface of the disk • The **laser** burns **pits** onto the surface of the disk • The **laser** is used to **read the pits and lands** on the surface of the disk • The **reflected** light from the laser shining on the disk is **captured** (by a sensor)	**3**
3(c)(i)	Any **three** from: • It is **small** in size // compact // lightweight // portable • It has low power consumption • It runs quietly • It runs at a cool temperature • It is robust when dropped // durable • Fast **access**/**read**/**write** speed • High capacity • Not affected by magnets	**3**
3(c)(ii)	• Operating system • Application software // by example • Utility software // by example	**2**

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Question	Answer	Marks
4(a)	• Computer consist of transistors / logic circuits/gates … • … that can only **store**/**process** data in **two states / high-low / on-off / 1 and 0**	**2**
4(b)	• 01000000 • 01100101 • 11110010	**3**
4(c)	• 0100 (1 mark) 0010 (1 mark) • 1100 (1 mark) 1110 (1 mark)	**4**

•

Question	Answer	Marks
5	**Two** marks for two correct stages of working, **one** mark for correct final answer • 100 × 150 • 15 000 × 16 // 15 000 × 2 • 240 000 / 8 • 30 000 bytes	**3**

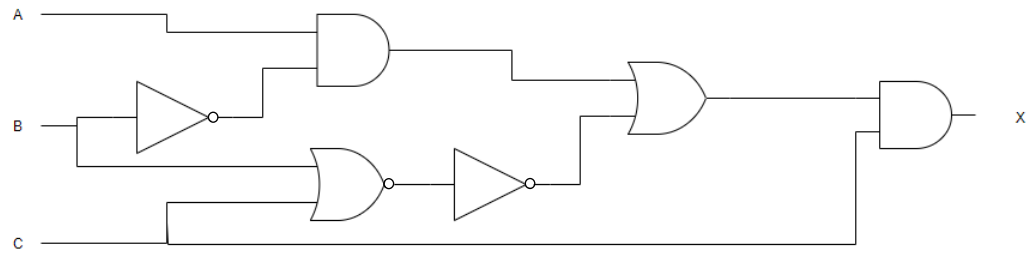
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Question	Answer	Marks
6(a)(i)	• They both report/check for errors	**1**
6(a)(ii)	**Four** from (**MAX 2** per translator): • An interpreter translates the code line by line (and executes each line immediately) • … whereas a compiler translates the whole code **at the same time** (before executing it) • A compiler produces an executable file • … but an interpreter does not • An interpreter is required to run the code each time if used • … whereas a compiler is not • An interpreter stops and reports an error as it is encountered • … whereas a compiler creates a report of all errors at the end of translation • An interpreter will run code up to the point it finds an error • … whereas a compiler will not run the code at all if an error is found	**4**

Question	Answer	Marks
7(a)	Any **one** from: • Uses biological data • It uses **characteristics/features** that belong to a **human**	**1**
7(b)	Any **two** from**:** • A biometric password cannot be guessed • It is very difficult to fake a biometric password • A biometric password cannot be recorded by a keylogger/spyware • A perpetrator cannot shoulder surf to see a biometric password	**2**

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Question	Answer	Marks
7(c)	Any **three** from: • The traffic/data is **compared to** set criteria/rules/whitelist/blacklist • If the traffic/data does/does not meet the criteria/rules/whitelist/blacklist it will be rejected/blocked … • … and an alert can be sent to warn Adele • … this can help prevent hackers/malicious software (gaining access to the data)	**3**
7(d)	• It makes the data meaningless	**1**

Question	Answer	Marks
8(a)	**One** mark for each correct logic gate with correct input(s)  	**6**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>8(b)</td><td>Four marks for 8 correct outputs
Three marks for 6/7 correct outputs
Two marks for 4/5 correct outputs
One mark for 2/3 correct outputs

<table>
<tr><th>A</th><th>B</th><th>C</th><th>Working space</th><th>X</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td></td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td></td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td></td><td>0</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td></td><td>1</td></tr>
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</table>
</td><td>4</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>9(a)</td><td>One mark for each correct row:

<table>
<tr><th>Statement</th><th>Browser (✓)</th><th>IP address (✓)</th><th>URL (✓)</th></tr>
<tr><td>it contains the domain name</td><td></td><td></td><td>✓</td></tr>
<tr><td>it is a type of software</td><td>✓</td><td></td><td></td></tr>
<tr><td>it converts Hypertext Markup Language (HTML) to display web pages</td><td>✓</td><td></td><td></td></tr>
<tr><td>it is a type of address</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>it stores cookies</td><td>✓</td><td></td><td></td></tr>
</table></td><td>5</td></tr>
</table>

Question	Answer	Marks
10	Any **three** from**:** • It is a unique address • It is assigned by the manufacturer • It can be used to identify a device • It contains the manufacturer ID/code/number • It contains the **serial** code/number • It is written in hexadecimal • It has 6 bytes/48 bits/6 pairs of digits • Does not (usually) change // static	**3**

Question	Answer	Marks
11(a)	**One** mark for each of the correct terms, in the correct place • buffer • nozzles • liquid • thermal bubble • interrupt	**5**
11(b)	Any **three** from e.g.: • Monitor // screen • Speaker • Headphones • Light // LED • (2D/3D) cutter • DLP // LCD projector • Actuator	**3**
11(c)	Any **two** from e.g.: • Keyboard • Mouse // trackerball • Microphone • (2D/3D) scanner • Barcode reader • QR code reader • **Digital** camera // webcam • Interactive whiteboard • Touchscreen • Sensor	**3**

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Question	Answer	Marks
12	**One** mark for identification of an issue and **one** mark for a description e.g.: • Plagiarism – The copying of other people's work without their permission – Claiming someone else's work as your own • Hacking – Unauthorised access to a computer/data • Malware – Malicious software designed to damage a computer system or stored data • Spyware – Keylogger used to record keypresses and sends them to third party • Ransomware – Holding hostage a user's data, often for a release fee • Intellectual property theft – Stealing other people work • Breaching copyright – Breaking the law by copying someone's work • Piracy – Using piracy websites to gain content for free that should have been paid for • Privacy – A person's data could be leaked • Phishing – Sending an email to lure users to a fake site to obtain their personal details	**6**

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Question	Answer	Marks
12	• Pharming – Downloading of malicious code to redirect user to fake website to obtain their personal details • Data protection – A person's data is not used according to the law • Cyber bullying – Using the internet to bully people • Inappropriate materials – Materials that could cause harm/offense to people e.g. minors • Fake news – News stories that could be very misleading or harmful • Software cracking – Changing code to e.g. bypass a licence for software • Addiction – Aspects of the internet e.g. social media can cause this • Environmental effects – Increased use of the internet increases the use of electrical power	

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