Cambridge Assessment International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/11**

Paper 1 Theory **October/November 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 October/November 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **15** printed pages.

PUBLISHED

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.

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.

Question	Answer	Marks
1(a)	**One** mark for a correct device and **one** mark for a corresponding example • Keyboard • … e.g. to type In a shop name • Mouse • … e.g. to click on a shop • Microphone • … e.g. to speak the shop name as a voice command • Touchscreen • … e.g. to select a shop • Barcode scanner • … e.g. to scan a barcode for a voucher • Sensor • … e.g. to detect when a person walks past • Digital camera // webcam • … e.g. to video call for assistance	**2**

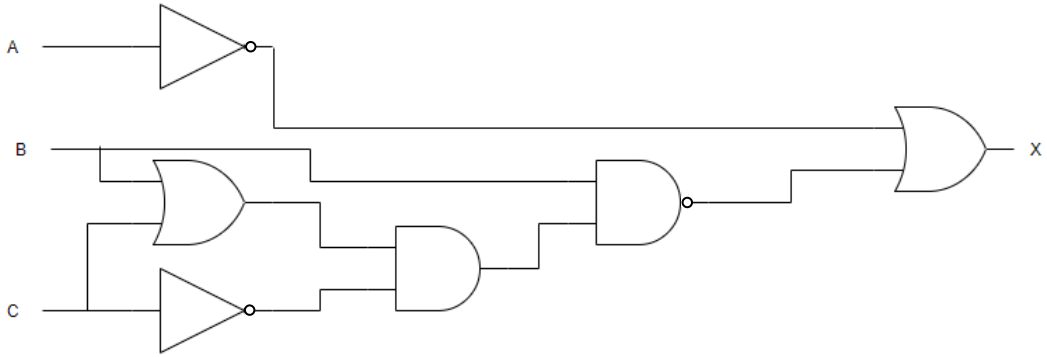
Question	Answer	Marks
1(b)	**One** mark for a correct device and **one** mark for a corresponding example • Display screen / monitor / touchscreen • … e.g. to see a shops location • Speaker // headphones • …. e.g. to hear where a shop is located • Printer • …. e.g. to get a hard copy of shop information • LED/Light • … e.g. to indicate where a shop is on the map	**2**
1(c)	**One** mark for a correct storage and **one** mark for a corresponding example • Random access memory // RAM • … to store data the is currently being processed • … to store the OS/programs/applications whilst in use • Read only memory // ROM • … to store the start-up instructions • … to store the BIOS	**2**

Question	Answer	Marks
2(a)	**One** mark for each correct bus (max 2) and **one** mark for corresponding description of transmission • Data bus • …. responsible for transmitting data/instructions • Control bus • … responsible for transmitting control signals	**4**
2(b)	Any **one** from: • Fetch • Decode	**1**
2(c)	Any **two** from: • To **temporarily** store data • It stores the **result** of interim **calculations** **One** from: • Arithmetic logic unit / ALU	**3**

Question	Answer	Marks
3(a)	**One** mark for two correct characters, **two** marks for three, in the correct place • 0100 0000 0100	**2**
3(b)	**One** mark for two correct characters, **two** marks for three • 0001 0010 1011	**2**
3(c)	**One** mark for each correct denary conversion • 34 • 172	**2**
3(d)	**One** mark for two correct characters, **two** marks for three, in the correct place • 9E0	**2**
3(e)	Any **two** from: • It is easier for user to read/recognise/understand • It takes up less space on a **display**	**2**

Question	Answer	Marks
4(a)	**One** mark for identification of the method (max 2), **two** marks for describing how the method could be used • Phishing • A legitimate looking email is sent to her, asking her to **click a link** • … this takes her to a fake website where she enters her bank details • Pharming • She accidentally downloads **malicious** software onto her computer • … this **redirects** her legitimate website requests to a fake website where she enters her bank details • Hacking • A person gains **unauthorised access** to her computer • .. they steal/view a data file that contains her bank details • Spyware • Records the key presses on her computer • … this data is **analysed** for patterns and her bank details are identified	**6**
4(b)(i)	• The data will be **meaningless** if it is stolen	**1**
4(b)(ii)	**One** from: • Data is **encrypted** and **decrypted** using the **same** key/algorithm Any **three** from: • Data before encryption is known as plain text • Data after encryption is known as cypher text • Key is sent to receiver (to allow data to be decrypted) // Values are sent to receiver that are used to generate key	**4**

Question	Answer	Marks
4(b)(iii)	Any **three** from: • Firewall // proxy server • Password • Biometric device • Virtual measure e.g. onscreen keyboard • Two-step verification // two factor authentication • Physical methods • Antimalware // Antispyware // Antivirus	**3**

Question	Answer	Marks
5(a)	**One** mark for each correct logic gate with correct input(s)  	**6**
5(b)	Any **one** from: • NOR • XOR // EOR	**1**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(c)</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>1</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>1</td></tr>
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</table>
</td><td>4</td></tr>
</table>

Question	Answer	Marks
6	**One** from: • Interrupt Any **two** from e.g.: • Paper jam • Paper tray empty • Any change of task example • Any error occurrence example	**3**

Question	Answer	Marks
7(a)	• Low-level language	1
7(b)	• Assembler	1
7(c)	Any **two** from: • He can directly access the hardware • He can use special machine-dependent instructions • There is no need for the program to be portable • Smaller file size // takes up less storage space • More efficient use of memory • Programs will be more time efficient when running	2
7(d)	Any **two** from: • Programs are not portable • It is complex to learn • Difficult to debug	2

Question	Answer	Marks
8(a)(i)	Any **two** from e.g.: • Background colour • Font colour • Font size • Font style	**2**
8(a)(ii)	Any **two** from e.g.: • Placement of text • Placement of image	**2**
8(b)	Any **five** from: • Web **browser** sends request to web **server** • … to view the digital certificate • Web server sends the digital certificate to the web browser • Web browser checks the certificate for authenticity • If certificate is authentic a secure connection is created • Any data sent is encrypted • If certificate is not authentic the connection is rejected • Uses a protocol such as SSL/TLS	**5**

Question	Answer	Marks
8(c)	Any **two** from: • A (small) text files • … that is stored by the browser • … sent between web **server** and **browser** when user visits the website Any **two** from e.g.: • To track users browsing habits • To store personal details • To tailor web page to user's presentation requirements • To store items in a virtual shopping cart • To tailor adverts to a user	**4**
8(d)	**One** from: • Proxy server Any **three** from: • It examines the incoming traffic to server • It limits the number of requests to the website • … preventing too many requests that could overwhelm the server • Block multiple requests from the same IP within a timeframe	**4**