Cambridge Assessment International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/11**

Paper 1 **May/June 2021**

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 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **8** 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.

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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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 MP has ellipsis at the beginning, but there is no ellipsis on the MP 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)	One mark per each correct register. 1 0 1 0 0 1 1 1 1 1 0 1 0 1 1 0	**2**
1(b)(i)	Any **one** from: – Both addresses can be used to identify a computer/device – Both are unique – Both can be represented as hexadecimal – Both addresses do not change if IP address is static	**1**
1(b)(ii)	Any **two** from: – An IP address is assigned by the network/router/ISP, A MAC address is assigned by the manufacturer – An IP address can be changed (if dynamic), MAC address cannot be changed – IP address has 4/8 groups of values, MAC address has 6 groups/pairs of values – IP address is 32-bit/128-bit, MAC address is 48-bit – IP address does not contain serial number/manufacturer number, MAC address does – IP(v4) address is denary and MAC address is hexadecimal	**2**

Question	Answer	Marks
2(a)	Any **three** from: – Keyboard – Mouse – Microphone – Keypad – Touchscreen – Touchpad	**3**

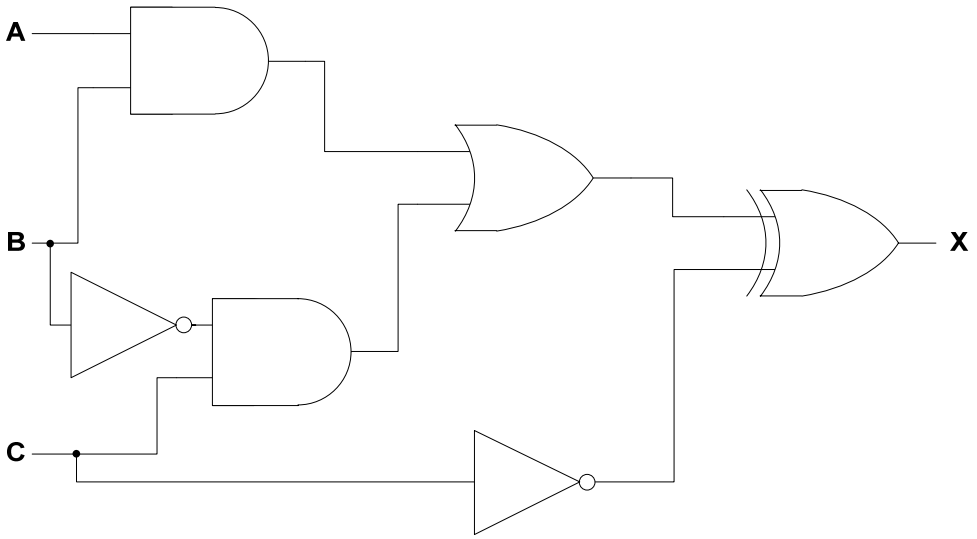
<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(b)</td><td>One mark for each correct row.
<table>
<tr><th>Statement</th><th>HDD (✓)</th><th>SSD (✓)</th><th>USB flash memory drive (✓)</th></tr>
<tr><td>it has no moving parts</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>it is non-volatile</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>it can use NAND gates to store data</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>it uses magnetic properties to store data</td><td>✓</td><td></td><td></td></tr>
<tr><td>it has the smallest physical size</td><td></td><td></td><td>✓</td></tr>
<tr><td>it has the slowest read/write speeds</td><td>✓</td><td></td><td></td></tr>
</table></td><td>6</td></tr>
<tr><td>2(c)(i)</td><td>Any two from:
– It cannot be inserted incorrectly
– Supports different transmission speeds
– High speed transmission
– Automatically detected (not connected) // automatically downloads drivers
– Powers the device (for data transfer)
– Backward compatible</td><td>2</td></tr>
<tr><td>2(c)(ii)</td><td>– Serial</td><td>1</td></tr>
</table>

Question	Answer	Marks
3(a)	One mark per each correct term in the correct order. – Software – Network – Criteria – Accept // reject – Reject // accept – Hacking	6

Question	Answer	Marks
3(b)	Any **three** from: – Password – Biometrics (device) – Encryption – Physical methods (e.g. locks) – Two-factor authentication // Two-step verification – Anti-viruses	**3**

Question	Answer	Marks
4	Any **six** from: Phishing – Legitimate looking email sent to user – encourages user to **click a link** that directs user to a fake website – User encouraged to enter personal details into a fake website // designed to obtain personal details from a user Pharming – Malicious code/malware is downloaded/installed // software downloaded without users' knowledge – … that **re-directs** user to fake website (when legitimate URL entered) – User encouraged to enter personal details into a fake website // designed to obtain personal details from a user	**6**

Question	Answer	Marks
5	**Eight** from: – Sensor send data/readings/signal to microprocessor – Data is converted from analogue to digital (using ADC) – Microprocessor compares/checks data to stored values/range of values … – … If data is greater than 30 / above the range microprocessor sends **signal** to open window and to turn heater off – … If data is below 25 the microprocessor sends **signal** to turn on heater and to close window – … If data is between 25 and 30 / within the range no action taken – Actuator is used to operate heater/window – **Whole** process is continuous	**8**

Question	Answer	Marks
6(a)	One mark per each correct logic gate, with correct input: 	**6**
6(b)	– Row 1 – Row 3 – Row 4 – Row 5	**4**

Question	Answer	Marks
7(a)(i)	**Four** from: – (Compression) **algorithm** is used – No data will be removed // original file can be restored – Example of type of algorithm that would be used e.g. RLE – Repeated patterns in the music are identified – … and indexed NOTE: If another lossless method is described, marks can be awarded.	**4**
7(a)(ii)	Any **one** from: – To provide the highest quality of music file (that compression will allow) – The user is able to listen to the original sound file – No loss of quality for the sound file provided	**1**
7(a)(iii)	Any **one** from: – Allow for quicker streaming speed – Would not require as much bandwidth (to stream) – Does not need as much RAM – Smoother listening experience // less lag – Will not use as much of data allowance	**1**

Question	Answer	Marks
7(a)(iv)	**Two** from: – Streaming speed may be slower – … and may affect listening experience // buffering may occur – User may need more bandwidth to stream – … that could be more expensive – It would be a larger file size – … so may take longer to upload – … so will take up more storage space … – … on webserver	**2**
7(b)	Any **four** from: – Browser sends URL to DNS – … using HTTP/HTTPS – IP address is found on DNS – DNS returns IP address to the browser – Browser sends request to web server/IP address – Web server sends web pages back to browser – Browser **interprets/renders** the HTML (to display web pages) – Security certificates exchanged	**4**
7(c)	**Two** from: – **Web server** has been flooded with traffic // **web server** has been sent many requests at once – … so, server is brought to a halt / crashes	**2**

Question	Answer	Marks
8(a)	– Odd – Odd – Even – Even	**4**
8(b)	Any **one** from: – there is a transposition of bits – it does not check the order of the bits (just the sum of 1s/0s) – even number of bits change – incorrect bits still add up to correct parity	**1**
8(c)(i)	**Four** from: – Multiple **bits** are sent **at the same time** – Uses multiple wires – Data is sent in both directions … – … but only one direction **at a time**	**4**
8(c)(ii)	Any **two** from: – Bits may arrive skewed – More expensive **to setup/manufacture/purchase cable** – Limited distance – More prone to interference/error	**2**

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