Cambridge Assessment International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/13**

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.

[Turn over

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 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.

Question	Answer	Marks
1(a)(i)	– manufacturer	**1**
1(a)(ii)	One mark per each correct binary value. – 00010100 – 10100000 – 11001001	**3**
1a(iii)	One mark per each correct denary value. – 41 – 200	**2**
1(b)(i)	– Magnetic – Solid state – Optical	**3**
1(b)(ii)	Any **four** from: – It has platters – Platters/disk divided into tracks – Platter/disk is spun – Has a read/write arm that moves across storage media – Read/writes data using **electromagnets** – Uses magnetic fields to control magnetic dots of data – Magnetic field determines binary value	**4**

Question	Answer	Marks
2(a)	Any **three** from: – A compression algorithm is used – Redundant data is removed – Reduce colour depth – Reduce image resolution – Reduce sample rate – Reduce sample resolution – Reduce frame rate – Use perceptual music shaping – Data is **permanently** removed	3
2(b)	Any **two** from: – Lossy decreases the **file size** more – Take up less storage space on webserver/users' computer – Quicker to upload/download – May not need to be high quality – Website will load faster for users – Less lag/buffering when watching – Takes up less bandwidth to download/upload – Uses less data allowance	**2**

Question	Answer	Marks
3(a)	**One** mark per each correct term, in the correct place. – LED – Photoelectric – Lens – Magnifies – Microswitch – USB	**6**
3(b)	Any **two** from: – Keyboard – Microphone – 2D/3D Scanner – Sensor – Touchscreen – Keypad – Webcam – Joystick	**2**

Question	Answer	Marks
4(a)	– Legitimate looking/fake email sent to user – … that contains a link to a fake website – User **clicks link** and enters personal details (into fake website)	**3**
4(b)	Any **two** from: – Pharming – Spyware – Hacking/cracking	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5</td><td>One mark per each correct row
<table>
<tr><th>Statement</th><th>High-level language (✓)</th><th>Assembly language (✓)</th><th>Machine code (✓)</th></tr>
<tr><td>It requires a translator to be processed by a computer</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>It is an example of low-level language</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>It uses mnemonics</td><td></td><td>✓</td><td></td></tr>
<tr><td>It uses English-like statements</td><td>✓</td><td></td><td></td></tr>
<tr><td>It can be used to directly manipulate hardware in the computer</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>It is portable</td><td>✓</td><td></td><td></td></tr>
</table></td><td>6</td></tr>
</table>

Question	Answer	Marks
6(a)	– Odd – Even – Even – Odd	**4**
6(b)	Any **one** from: – There is a transposition of bits – Bits still add up to correct parity	**1**
6(c)(i)	– Data is sent one bit at a time – Data is sent using a single wire – Data is sent in both direction … – … at the same time	**4**
6(c)(ii)	Any **one** from: – Data transmission can be slower (than parallel) – Additional data may need to be sent	**1**

Question	Answer	Marks
7(a)	Any **two** from: – Hardware failure – Software failure – Power failure/surge – Fire – Flood – Natural disaster	**2**
7(b)	Any **two** from: – Use verification methods before deleting files – Keep data in a fireproof box – Do not drink liquids near a computer – Use surge protection // UPS – Correct shutdown procedures – Access rights – Back data up	**2**

Question	Answer	Marks
8(a)	– AND – NOR – XOR	**3**
8(b)	– Row 1 – Row 4 – Row 7 – Row 8	**4**

Question	Answer	Marks
9(a)	One mark per each correct sensor	**3**

Task	Sensor
Check if a vehicle is too high	**Infrared/light**
Count the vehicles entering the car park	**Magnetic field // pressure**
Check if a vehicle is parked in a parking space	**Pressure // magnetic field // infrared/light**

Question	Answer	Marks
9(b)	**Six** from: – Sensor sends data to microprocessor – Data is converted from analogue to digital (using ADC) – Data is compared to stored value … – … If data is greater than stored value microprocessor sends signal to turn red light on and the green light off – … If data is less than stored value microprocessor sends signal to turn green light on the red light off – … If data still within range, no action taken/existing light remains on – Lights turned on/off using actuator – Process is continuous	**6**

Question	Answer	Marks
10(a)	One mark per each correct row	**6**
10(b)	Any **two** from: – MAR – MDR // MBR – PC – CIR // IR	**2**

Statement	ALU (✓)	CU (✓)	RAM (✓)
Stores data and instructions before they enter the central processing unit (CPU)			✓
Contains a register called the accumulator	✓		
Manages the transmission of data and instructions to the correct components		✓	
Contained within the CPU	✓	✓	
Uses the data bus to send data into or out of the CPU	(✓)		✓
Carries out calculations on data	✓		