Cambridge Assessment International Education

# Cambridge IGCSE™

**COMPUTER SCIENCE** **0478/11**

Paper 1 **May/June 2020**

MARK SCHEME

Maximum Mark: 75

**Published**

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level 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.

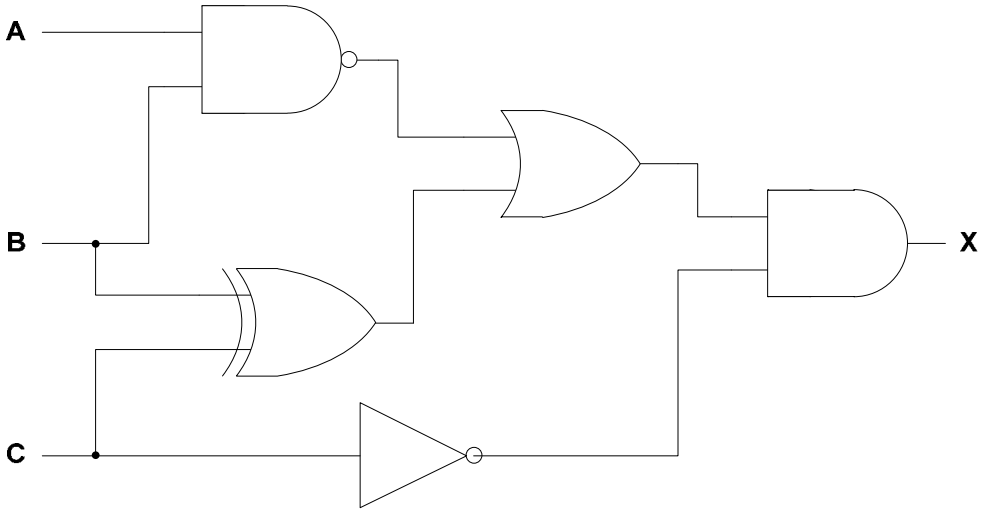
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|---|
| GENERIC MARKING PRINCIPLE 5:<br><br>Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen). |
| GENERIC MARKING PRINCIPLE 6:<br><br>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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| Question | Answer | Marks |
|---|---|---|
| 1(a) | Any **one** from:<br>– Microphone<br>– Touchscreen<br>– Camera<br>– Button | **1** |
| 1(b) | Any **two** from:<br>– Speaker<br>– Touchscreen<br>– Light/flash | **2** |
| 1(c)(i) | Any **one** from:<br>– Media access control<br>– Unique address given to each device | **1** |
| 1(c)(ii) | Any **three** from:<br>– Uses hexadecimal values<br>– Normally 48/64 bits in length (accept any other reasonable value)<br>– First half is manufacturer number/code/ID<br>– Second half is serial number | **3** |
| 1(d) | – It needs RAM to store the data and programs currently in use<br>– It needs ROM to permanently store the boot up instructions | **2** |
| 1(e)(i) | Any **two** from:<br>– Fingerprint scanner<br>– Voice recognition<br>– Retina/iris recognition<br>– Facial recognition | **2** |
| 1(e)(ii) | Any **two** from:<br>– Adds extra level of security<br>– Biometric device requires properties unique to individual<br>– Allows quicker access as no need to input password // don't need to remember password | **2** |

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| Question | Answer | Marks |
|---|---|---|
| 2(a) | <br>1 mark for each correct gate. | 5 |

| Question | Answer | Marks |
|---|---|---|
| 2(b) | | 4 |

| A | B | C | Working space | X |
|---|---|---|---|---|
| 0 | 0 | 0 | | **1** |
| 0 | 0 | 1 | | **0** |
| 0 | 1 | 0 | | **1** |
| 0 | 1 | 1 | | **0** |
| 1 | 0 | 0 | | **1** |
| 1 | 0 | 1 | | **0** |
| 1 | 1 | 0 | | **1** |
| 1 | 1 | 1 | | **0** |

4 marks for 8 correct outputs
3 marks for 6 or 7 correct outputs
2 marks for 4 or 5 correct outputs
1 mark for 2 or 3 correct outputs

| Question | Answer | Marks |
|---|---|---|
| 3(a) | Any **three** from:<br>– It is a universal standard<br>– It can't be inserted the wrong way around<br>– Supports different transmission speeds<br>– Automatically detects if correct driver installed<br>– It will charge the mobile device at the same time | **3** |

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| Question | Answer | Marks |
|---|---|---|
| 3(b) | – Serial | 1 |
| 3(c) | – A compression algorithm is used<br>– No data is removed in the compression process<br>– An index/dictionary of pixels is created<br>– The number of times a pixel is repeated in a row is stored | 4 |

| Question | Answer | Marks |
|---|---|---|
| 4(a) | Any **two** from:<br>– They both calculate a value from the data<br>– They both append the calculated value to the data<br>– They both recalculate the value<br>– … They both report an error if they don't match | 2 |
| 4(b) | **One** mark for method, **three** marks for description:<br>**Automatic Repeat reQuest**<br>– Uses acknowledgement / request and time-out<br>– Error control protocol<br>– Check performed on receiving data // error is detected by e.g. parity check, check sum<br>– If error detected, request is sent to resend data // negative acknowledgement is used<br>– Resend request is repeated till data is sent correctly / requests timeout / limit is reached<br>– Send acknowledgement that data is received // positive acknowledgement is used<br>– If acknowledgement not received in set time data is resent<br><br>**Parity Check**<br>– A parity bit is added (to the parity byte)<br>– Counts / checks number of 1's<br>– Can be even or odd<br>– If parity is incorrect, error is detected | 4 |

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| Question | Answer | Marks |
|---|---|---|
| 5 | | 6 |

| Component | CPU component (✓) | Not a CPU component (✓) |
|---|---|---|
| Arithmetic logic unit (ALU) | ✓ | |
| Hard disk drive (HDD) | | ✓ |
| Memory address register (MAR) | ✓ | |
| Random access memory (RAM) | | ✓ |
| Solid state drive (SSD) | | ✓ |
| Control unit (CU) | ✓ | |

**One** mark per each correct row

| Question | Answer | Marks |
|---|---|---|
| 6 | | 4 |

| Sensor | Scenario |
|---|---|
| Pressure / motion / infra-red | Detecting when a person is approaching an automatic door system |
| pH / light | Monitoring the pollution level in a river |
| Temperature | Checking if a tropical aquarium is 25 degrees Celsius |
| Magnetic field / pressure / motion / infra-red | Counting the number of cars that cross a bridge |

One mark per each correct sensor (each sensor **must** be different)

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| Question | Answer | Marks |
|---|---|---|
| 7(a)(i) | Any **four** from:<br>– Keylogger is downloaded without knowledge (by example)<br>– Keylogger records key presses<br>– Data is relayed back to third party<br>– Data is analysed // Patterns in data could reveal log-in details …<br>– … details can then be used to log into the account | **4** |
| 7(a)(ii) | Any **one** from:<br>– Use drop-down boxes for password<br>– Two-step verification (by example)<br>– Partial password requests<br>– Onscreen / virtual keyboard | **1** |
| 7(b)(i) | Any **one** from:<br>– Look for locked padlock / green padlock<br>– Check for https | **1** |
| 7(b)(ii) | Any **four** from:<br>– requests web server to identify itself // request to view the (SSL) certificate<br>– receives a copy of the (SSL) certificate, sent from the webserver<br>– checks if (SSL) certificate is authentic/trustworthy<br>– sends signal back to webserver that the certificate is authentic/trustworthy | **4** |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>8(a)</td><td>– Interrupt</td><td>1</td></tr>
<tr><td>8(b)</td><td>One mark for benefit, two marks for drawbacks<br>Benefit:<br>– Printing may be higher quality<br>– Can use larger paper sizes<br>– Can print onto different media<br>– No warm-up time<br><br>Drawbacks:<br>– Printing will be slower<br>– Ink is more expensive per page<br>– Ink can be smeared // ink is not smudge proof</td><td>3</td></tr>
<tr><td>8(c)</td><td>
<table>
<tr><th>Statement</th><th>Inkjet (✓)</th><th>Laser (✓)</th></tr>
<tr><td>Uses a rotating drum to transfer the image to the paper</td><td></td><td>✓</td></tr>
<tr><td>Uses powdered toner</td><td></td><td>✓</td></tr>
<tr><td>Uses nozzles to spray droplets on to the paper</td><td>✓</td><td></td></tr>
<tr><td>Uses a print head mechanism that moves side to side</td><td>✓</td><td></td></tr>
</table>
One mark per each correct row</td><td>4</td></tr>
</table>

| Question | Answer | Marks |
|---|---|---|
| 9(a) | Any **three** from:<br>– Closer to/is machine code<br>– May use mnemonics<br>– May need an assembler to be translated<br>– One line of code represents a single instruction<br>– Machine dependent<br>– Have direct access to memory locations/registers | **3** |
| 9(b) | – Assembly code<br>– Machine code | **2** |
| 9(c) | Any **one** from:<br>– It is more difficult to understand<br>– Error prone<br>– Have to manipulate memory locations<br>– Machine dependent | **1** |
| 9(d)(i) | – 10110100<br>– 11001001 | **2** |
| 9(d)(ii) | – 000011111010 (must have leading zeros) | **1** |
| 9(d)(iii) | – 93<br>– 1D | **2** |

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