Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

COMPUTER SCIENCE **0478/12**

Paper 1 **March 2019**

MARK SCHEME

Maximum Mark: 50

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 March 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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.

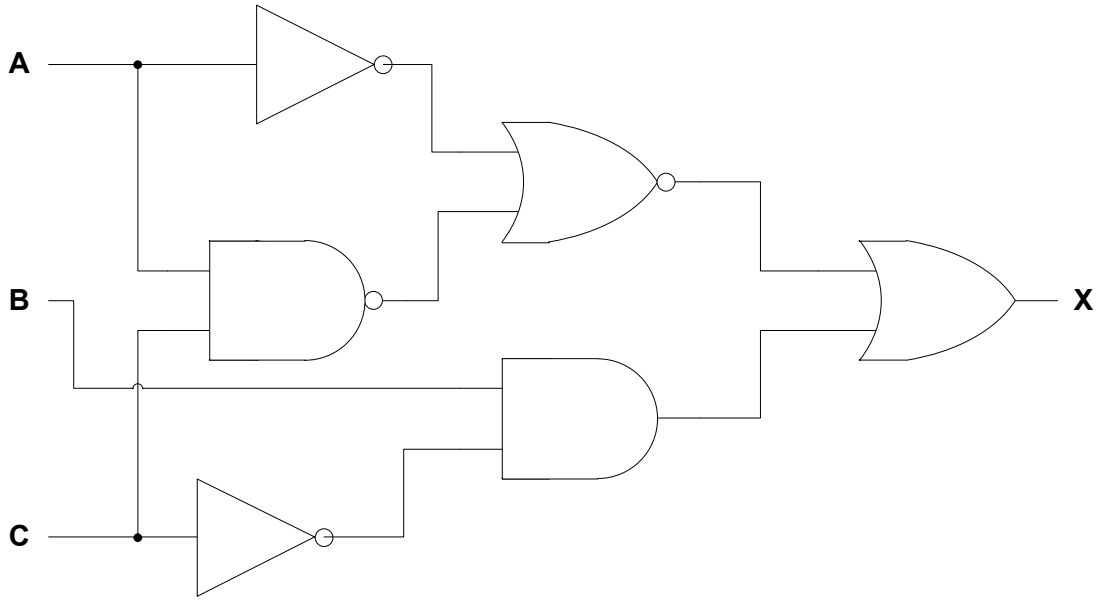
<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>
<table>
<tr><th>File size</th><th>Tick (✓)</th></tr>
<tr><td>20 MB</td><td></td></tr>
<tr><td>10 GB</td><td>✓</td></tr>
</table>
</td><td>1</td></tr>
<tr><td>1(b)</td><td>
<table>
<tr><th>File size</th><th>Tick (✓)</th></tr>
<tr><td>3500 kB</td><td>✓</td></tr>
<tr><td>3 MB</td><td></td></tr>
</table>
</td><td>1</td></tr>
</table>

Question	Answer	Marks
2(a)(i)	– (A device that allows) **data** to be entered (into a computer system)	**1**
2(a)(ii)	**One** from e.g.: – Keyboard – Mouse – Microphone – Sensor – Touch screen	**1**
2(b)(i)	– (A device that allows the user to) view/hear the **data** (that has been entered into a computer system)	**1**
2(b)(ii)	**One** from e.g. : – Monitor – Speaker – Headphones – Printer	**1**

Question	Answer	Marks
3(a)(i)	– 000000100111 1 mark 1 mark	**2**
3(a)(ii)	– 000101011110 1 mark 1 mark	**2**
3(a)(iii)	1 mark for working, 1 mark for correct answer – 1024 + 512 + 128 + 64 + 4 + 2 + 1 – 1735	**2**
3(b)(i)	**Two** from: – Pressure sensor – Light sensor – Motion sensor – Magnetic field (can be used if competitors are wearing a compatible chip)	**2**
3(b)(ii)	– Sensor sends signal to microprocessor – Signal is analogue and is converted to digital (using ADC) – Data is compared to stored value // Check for signal – If data does not match / is out of range/ in range // signal detected … – … counter is incremented by 1 – Continuous process	**6**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(a)</td><td>Two from:
– Closer to English statements / human language
– Easier / quicker to write / read / understand / remember
– Easier / quicker to debug
– Less likely to make errors
– One line of code can carry out multiple commands
– Portable language</td><td>2</td></tr>
<tr><td>4(b)</td><td>1 mark for correct tick(s) for each statement
<table><tr><th>Statement</th><th>Compiler</th><th>Interpreter</th></tr><tr><td>A report of errors is produced at the end of translation</td><td>✓</td><td></td></tr><tr><td>The program is translated one line at a time</td><td></td><td>✓</td></tr><tr><td>The program is translated from high-level language into machine code</td><td>✓</td><td>✓</td></tr><tr><td>An executable file is produced</td><td>✓</td><td></td></tr><tr><td>The program will not run at all if an error is detected</td><td>✓</td><td></td></tr></table></td><td>5</td></tr>
<tr><td>4(c)</td><td>– Lossy would remove data
– Lossless does not remove data // No data can be lost …
– Can be restored to original state …
– … otherwise will not run / work correctly</td><td>4</td></tr>
<tr><td>4(d)(i)</td><td>– Sending device creates value from calculation on data // By example
– Value is transmitted with the data
– Receiving device performs same calculation
– Values are compared after transmission // If values do not match …
– … an error is detected</td><td>5</td></tr>
</table>

Question	Answer	Marks
4d(ii)	– Parity check – Check digit – Automatic repeat request	**3**

Question	Answer	Marks
5(a)	1 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>5(b)</td><td>4 marks for 8 correct outputs
3 marks for 6/7 correct outputs
2 marks for 4/5 correct outputs
1 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>0</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td></td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td></td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td></td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td></td><td>1</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td></td><td>1</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td></td><td>1</td></tr>
</table>
</td><td>4</td></tr>
</table>

Question	Answer	Marks
6(a)	**Three** from: – Universal Serial Bus – Data transmission method – Uses serial transmission // bits of data are sent one at a time – Universal standard // common interface	**3**
6(b)(i)	– Laser printer	**1**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>6(b)(ii)</td><td>Two from:
– Cheaper printing cost per page
– It prints at a faster speed
– It prints text at a high quality
– Colour fast</td><td>2</td></tr>
<tr><td>6(b)(iii)</td><td>One from:
– Expensive to purchase printer
– Toner is expensive
– Print images at a lower quality
– Can be quite large in size</td><td>1</td></tr>
<tr><td>6(c)(i)</td><td>1 mark per each correct tick
<table>
<tr><th>Storage example</th><th>Primary</th><th>Secondary</th><th>Off-line</th></tr>
<tr><td>Solid state drive (SSD)</td><td></td><td>✓</td><td></td></tr>
<tr><td>Blu-ray disc</td><td></td><td></td><td>✓</td></tr>
<tr><td>USB flash memory</td><td></td><td></td><td>✓</td></tr>
<tr><td>Random access memory (RAM)</td><td>✓</td><td></td><td></td></tr>
<tr><td>Read only memory (ROM)</td><td>✓</td><td></td><td></td></tr>
</table></td><td>5</td></tr>
</table>

Question	Answer	Marks
6(c)(ii)	**Six** from: – Storage device has platters – Platters/disk divided into tracks – Storage 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 NOTE: Marks can be awarded for an alternative description e.g. magnetic tape	**6**
6(c)(iii)	– Magnetic is cheaper **per unit of data** – Magnetic has more longevity // Magnetic can perform more read/write cycles	**2**

Question	Answer	Marks
7	For each of **three** risks Naming the risk – 1 mark, describing the risk – 1 mark: – Hacking … – … when a person tries to gain unauthorised access to a computer system – … data can be deleted/corrupted by hacker – Malware … – … a software program designed to damage data / disrupt the computer system – … replicates itself and fills the hard disk – Virus … – … a program that replicates itself to damage / delete files NOTE: Multiple kinds of malware can be awarded if listed and given a matching description e.g. trojan horse, worm.	**6**