



Cambridge IGCSE™

COMPUTER SCIENCE

0478/11

Paper 1

October/November 2020

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 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

This document consists of **11** 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:

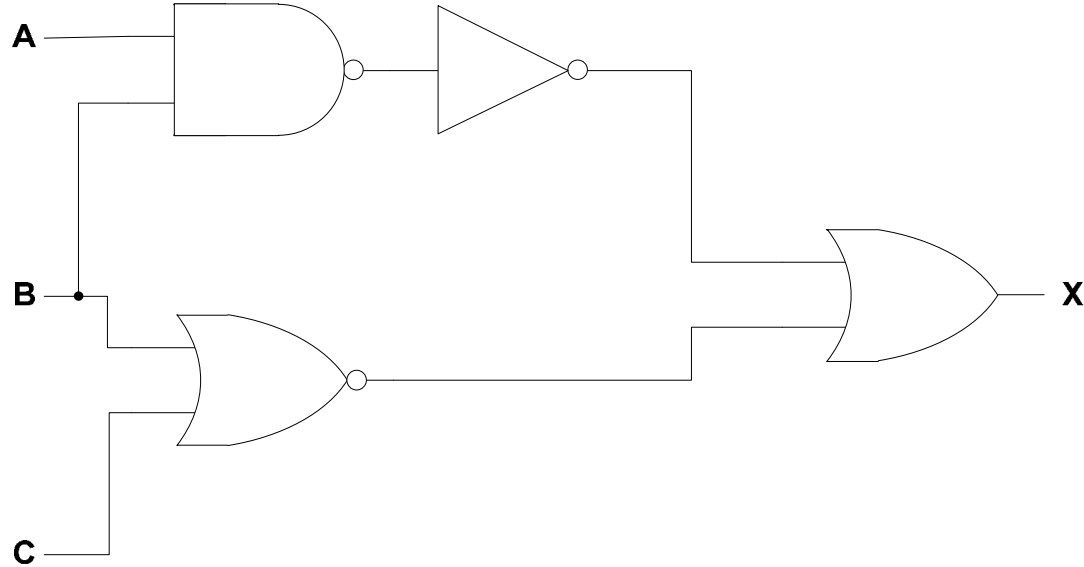
Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks																												
1	<p>One mark per each correct row:</p> <table border="1" data-bbox="338 284 1122 775"> <thead> <tr> <th data-bbox="338 284 669 379">Device</th> <th data-bbox="669 284 822 379">Input (✓)</th> <th data-bbox="822 284 972 379">Output (✓)</th> <th data-bbox="972 284 1122 379">Storage (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 379 669 448">Keyboard</td> <td data-bbox="669 379 822 448">✓</td> <td data-bbox="822 379 972 448"></td> <td data-bbox="972 379 1122 448"></td> </tr> <tr> <td data-bbox="338 448 669 517">Sensor</td> <td data-bbox="669 448 822 517">✓</td> <td data-bbox="822 448 972 517"></td> <td data-bbox="972 448 1122 517"></td> </tr> <tr> <td data-bbox="338 517 669 585">3D Cutter</td> <td data-bbox="669 517 822 585"></td> <td data-bbox="822 517 972 585">✓</td> <td data-bbox="972 517 1122 585"></td> </tr> <tr> <td data-bbox="338 585 669 654">2D Scanner</td> <td data-bbox="669 585 822 654">✓</td> <td data-bbox="822 585 972 654"></td> <td data-bbox="972 585 1122 654"></td> </tr> <tr> <td data-bbox="338 654 669 722">Microphone</td> <td data-bbox="669 654 822 722">✓</td> <td data-bbox="822 654 972 722"></td> <td data-bbox="972 654 1122 722"></td> </tr> <tr> <td data-bbox="338 722 669 775">Hard disk drive (HDD)</td> <td data-bbox="669 722 822 775"></td> <td data-bbox="822 722 972 775"></td> <td data-bbox="972 722 1122 775">✓</td> </tr> </tbody> </table>	Device	Input (✓)	Output (✓)	Storage (✓)	Keyboard	✓			Sensor	✓			3D Cutter		✓		2D Scanner	✓			Microphone	✓			Hard disk drive (HDD)			✓	6
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2(a)	<p>One mark for each correct binary conversion One mark for each correct denary conversion</p> <table border="1" data-bbox="338 1007 1290 1302"> <thead> <tr> <th data-bbox="338 1007 618 1106">Hexadecimal ticket number</th> <th data-bbox="618 1007 1066 1106">12-bit binary value</th> <th data-bbox="1066 1007 1290 1106">Denary value</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 1106 618 1174">028</td> <td data-bbox="618 1106 1066 1174">0000 0010 1000</td> <td data-bbox="1066 1106 1290 1174">40</td> </tr> <tr> <td data-bbox="338 1174 618 1243">1A9</td> <td data-bbox="618 1174 1066 1243">0001 1010 1001</td> <td data-bbox="1066 1174 1290 1243">425</td> </tr> <tr> <td data-bbox="338 1243 618 1302">20C</td> <td data-bbox="618 1243 1066 1302">0010 0000 1100</td> <td data-bbox="1066 1243 1290 1302">524</td> </tr> </tbody> </table>	Hexadecimal ticket number	12-bit binary value	Denary value	028	0000 0010 1000	40	1A9	0001 1010 1001	425	20C	0010 0000 1100	524	6
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Question	Answer	Marks
2(b)	<p>Seven from:</p> <ul style="list-style-type: none"> – Camera captures code // Laser/light shone on code – Black squares reflect different light to white – Corner squares are used for alignment – Pattern converted to digital data // by example – (Digital) data sent to microprocessor – There is a database of valid QR codes – Data compared to stored values/valid QR codes ... – ... If data matches entry is granted is raised – ... If data matches count is incremented – ... If data does not match, entry is denied 	7

Question	Answer	Marks
3(a)	<ul style="list-style-type: none"> – Handshake – Record 	2
3(b)	<ul style="list-style-type: none"> – Web server – Certificate – Authentic – Browser – Signal 	5
3(c)	<p>Any one from:</p> <ul style="list-style-type: none"> – SSL – HTTPS 	1

Question	Answer	Marks
<p>4(a)</p>  <p>One mark for each correct gate with correct input</p>		<p>4</p>

Question	Answer	Marks																																													
4(b)	<p> 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 </p> <table border="1" data-bbox="338 384 1319 995"> <thead> <tr> <th data-bbox="338 384 416 469">A</th> <th data-bbox="416 384 495 469">B</th> <th data-bbox="495 384 573 469">C</th> <th data-bbox="573 384 1245 469">Working space</th> <th data-bbox="1245 384 1319 469">X</th> </tr> </thead> <tbody> <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>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td></td> <td>0</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>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td></td> <td>0</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> </tbody> </table>	A	B	C	Working space	X	0	0	0		1	0	0	1		0	0	1	0		0	0	1	1		0	1	0	0		1	1	0	1		0	1	1	0		1	1	1	1		1	4
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4(c)	<p>One mark for the correct gate and one mark for the correct truth table</p> <p>– AND</p> <table border="1" data-bbox="396 320 622 647"> <tr><td>A</td><td>B</td><td>X</td></tr> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td></tr> </table> <p>– XOR</p> <table border="1" data-bbox="396 719 622 1046"> <tr><td>A</td><td>B</td><td>X</td></tr> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td></tr> </table>	A	B	X	0	0	0	0	1	0	1	0	0	1	1	1	A	B	X	0	0	0	0	1	1	1	0	1	1	1	0	4
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Question	Answer	Marks
5(a)(i)	– Two valid examples of Structure e.g. where text is placed, margins of page	2
5(a)(ii)	– Two valid examples of Presentation e.g. font size, font colour	2
5(b)	<ul style="list-style-type: none"> – Firewall – Proxy server 	2

Question	Answer			Marks															
6(a)(i)	<ul style="list-style-type: none"> – Uses multiple wires – Sends multiple bits of data at a time 			2															
6(a)(ii)	<ul style="list-style-type: none"> – Faster transmission speed 			1															
6(b)(i)	<ul style="list-style-type: none"> – Control (bus) 			1															
6(b)(ii)	<ul style="list-style-type: none"> – Accumulator (ACC) 			1															
6(b)(iii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="338 520 1532 619" style="text-align: left;">Statement</th> <th data-bbox="1532 520 1644 619" style="text-align: center;">True (✓)</th> <th data-bbox="1644 520 1756 619" style="text-align: center;">False (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 619 1532 684">Data and instructions are stored in the same memory unit</td> <td data-bbox="1532 619 1644 684" style="text-align: center;">✓</td> <td data-bbox="1644 619 1756 684"></td> </tr> <tr> <td data-bbox="338 684 1532 750">The control unit manages operations within the CPU</td> <td data-bbox="1532 684 1644 750" style="text-align: center;">✓</td> <td data-bbox="1644 684 1756 750"></td> </tr> <tr> <td data-bbox="338 750 1532 815">Data and instructions can be fetched into the CPU at the same time</td> <td data-bbox="1532 750 1644 815"></td> <td data-bbox="1644 750 1756 815" style="text-align: center;">✓</td> </tr> <tr> <td data-bbox="338 815 1532 880">The control unit is responsible for decoding an instruction</td> <td data-bbox="1532 815 1644 880" style="text-align: center;">✓</td> <td data-bbox="1644 815 1756 880"></td> </tr> </tbody> </table>			Statement	True (✓)	False (✓)	Data and instructions are stored in the same memory unit	✓		The control unit manages operations within the CPU	✓		Data and instructions can be fetched into the CPU at the same time		✓	The control unit is responsible for decoding an instruction	✓		4
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The control unit is responsible for decoding an instruction	✓																		

Question	Answer	Marks
7	<p>Four from (Max two per format):</p> <p>MIDI</p> <ul style="list-style-type: none"> – Musical Instrument Digital Interface (file) – Stores a set of commands/instructions (for how the sound should be played) – Does not store the actual sounds – Data in the file has been recorded using digital instruments // produced by synthesizer – Specifies pitch of the note // specifies the note to be played – Specifies when each note plays and stops playing // Specifies key on/off – Specifies duration of the note – Specifies volume of the note – Specifies the tempo – Specifies the type of instrument – Individual notes can be edited <p>MP3</p> <ul style="list-style-type: none"> – MP3 is a format for digital audio – MP3 is an actual recording of the sound – MP3 is a (lossy) compression format – Recorded using a microphone 	4

Question	Answer	Marks
8(a)	<p>Any three from:</p> <ul style="list-style-type: none"> – Light emitting diodes (technology) – The display is made up of pixels – ... that are arranged together as a matrix – ... each is formed of three LEDs/filters – Shades of colour are achieved by mixing red, blue and green – The screen can be back-lit/edge-lit <p>NOTE: Use of liquid crystals with LED technology can also be awarded</p>	3

Question	Answer	Marks
8(b)	Any three from: <ul style="list-style-type: none"> – Energy efficient // low power consumption – Long lasting // longevity – Focussed beam // less light strays from beam – Brighter/vivid colours – High resolution – No flicker – Display is thinner – Mercury free technology // environmentally friendly – Fewer pixel failure – Increased viewing in sunlight 	3
8(c)	– LCD	1

Question	Answer	Marks
9(a)	<ul style="list-style-type: none"> – 1 – 0 – 0 – 0 	4
9(b)	Two from: <ul style="list-style-type: none"> – Checksum – Automatic repeat request // ARQ 	2
9(c)	Any four from: <ul style="list-style-type: none"> – Data is input with check digit – A calculation is performed on the (inputted) data // by example – The calculated digit is compared to a stored value – If it matches, the data entered is correct – If it does not match, the data entered is incorrect 	4