

Cambridge IGCSE™ (9–1)

COMPUTER SCIENCE

0984/12

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 **13** printed pages.

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(a)	Any one from: – Hypertext Mark-up Language – Web authoring language // language used to write/create websites/web pages	1																											
1(b)(i)	– Presentation	1																											
1(b)(ii)	One mark per each nibble: <table border="1" data-bbox="268 327 679 461"> <tbody> <tr> <td data-bbox="268 327 320 371">43</td> <td data-bbox="320 327 373 371">0</td> <td data-bbox="373 327 426 371">1</td> <td data-bbox="426 327 478 371">0</td> <td data-bbox="478 327 531 371">0</td> <td data-bbox="531 327 584 371">0</td> <td data-bbox="584 327 636 371">0</td> <td data-bbox="636 327 689 371">1</td> <td data-bbox="689 327 742 371">1</td> </tr> <tr> <td data-bbox="268 371 320 416">B7</td> <td data-bbox="320 371 373 416">1</td> <td data-bbox="373 371 426 416">0</td> <td data-bbox="426 371 478 416">1</td> <td data-bbox="478 371 531 416">1</td> <td data-bbox="531 371 584 416">0</td> <td data-bbox="584 371 636 416">1</td> <td data-bbox="636 371 689 416">1</td> <td data-bbox="689 371 742 416">1</td> </tr> <tr> <td data-bbox="268 416 320 461">F0</td> <td data-bbox="320 416 373 461">1</td> <td data-bbox="373 416 426 461">1</td> <td data-bbox="426 416 478 461">1</td> <td data-bbox="478 416 531 461">1</td> <td data-bbox="531 416 584 461">0</td> <td data-bbox="584 416 636 461">0</td> <td data-bbox="636 416 689 461">0</td> <td data-bbox="689 416 742 461">0</td> </tr> </tbody> </table>	43	0	1	0	0	0	0	1	1	B7	1	0	1	1	0	1	1	1	F0	1	1	1	1	0	0	0	0	6
43	0	1	0	0	0	0	1	1																					
B7	1	0	1	1	0	1	1	1																					
F0	1	1	1	1	0	0	0	0																					
1(c)(i)	– Input	1																											

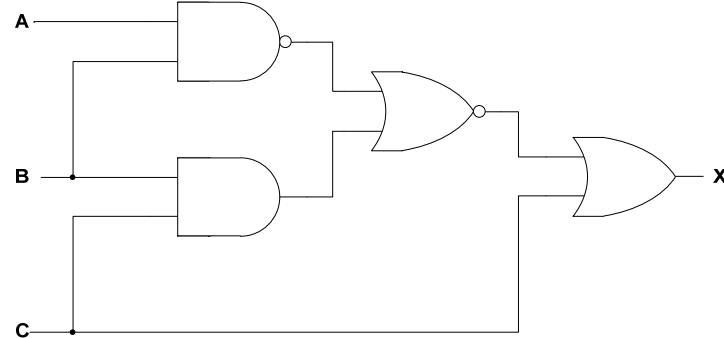
Question	Answer	Marks
1(c)(ii)	<p>One from:</p> <ul style="list-style-type: none"> – Lossy (compression) <p>Any three from:</p> <ul style="list-style-type: none"> – A (compression) algorithm is used – Removes redundant/unnecessary data from the file – Removes sounds that cannot be heard by the human ear/background noise – Reduces sample rate – Reduces sample resolution – Data is permanently removed // original file cannot be re-instated – Perceptual music shaping is used <p>NOTE: If lossless given, marks can be awarded for a correct description of lossless as follow through.</p> <p>Any three from (lossless):</p> <ul style="list-style-type: none"> – A (compression) algorithm is used – Repeating patterns are identified – ... are replaced with a value – ... and indexed – No data is permanently removed // original file can be re-instated – Suitable example of a lossless algorithm 	4
1(c)(iii)	<p>Any two from:</p> <ul style="list-style-type: none"> – Quicker for her to upload – Quicker for users to download – Won't slow website down as much when loading – Takes up less storage space 	2
1(d)(i)	<ul style="list-style-type: none"> – Handshake (layer) – Record (layer) 	2

Question	Answer	Marks
1(d)(ii)	Any six from: <ul style="list-style-type: none"> – Client/browser requests secure connection to server – Client/browser requests the server to identify itself – Server provides a digital certificate – Client/browser validates the certificate – Client/browser send signal back to server (to begin transmission) – Session caching can be used – A session key is generated – Encryption method is agreed // data is encrypted 	6
1(e)(i)	Any three from: <ul style="list-style-type: none"> – Hacking – Denial of service (DoS) attack – Virus – Malware NOTE: Three different type of malware can be awarded	3
1(e)(ii)	Any four from: <ul style="list-style-type: none"> – Acts as a firewall – Monitor/filters/examines incoming and outgoing traffic – Rules/criteria for traffic can be set // blacklist/whitelist set – Blocks any traffic that does not meet criteria ... – ... and can send a warning message to the user – Stop the website failing in a DoS attack // DoS attack hits the proxy server and not the webserver 	4

Question	Answer	Marks															
2(a)	<p>One mark for each correct row:</p> <table border="1" data-bbox="229 190 584 434"> <thead> <tr> <th data-bbox="229 190 432 253">8-bit binary value</th> <th data-bbox="432 190 507 253">Even (✓)</th> <th data-bbox="507 190 584 253">Odd (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="229 253 432 297">11111111</td> <td data-bbox="432 253 507 297">✓</td> <td data-bbox="507 253 584 297"></td> </tr> <tr> <td data-bbox="229 297 432 342">01100110</td> <td data-bbox="432 297 507 342">✓</td> <td data-bbox="507 297 584 342"></td> </tr> <tr> <td data-bbox="229 342 432 387">01111011</td> <td data-bbox="432 342 507 387">✓</td> <td data-bbox="507 342 584 387"></td> </tr> <tr> <td data-bbox="229 387 432 434">10000000</td> <td data-bbox="432 387 507 434"></td> <td data-bbox="507 387 584 434">✓</td> </tr> </tbody> </table>	8-bit binary value	Even (✓)	Odd (✓)	11111111	✓		01100110	✓		01111011	✓		10000000		✓	4
8-bit binary value	Even (✓)	Odd (✓)															
11111111	✓																
01100110	✓																
01111011	✓																
10000000		✓															
2(b)	<p>Any five from:</p> <ul style="list-style-type: none"> – A value is calculated from the data – The value is calculated using an algorithm // by example – The value is appended to the data to be transmitted – Value is recalculated after transmission – Values are compared – If the values match the data is correct // if the values do not match the data is incorrect 	5															

Question	Answer	Marks
3(a)(i)	<p>Any three from:</p> <ul style="list-style-type: none"> – Loss of power/electricity – Spillage of liquids – Flood – Fire – Human error – Hardware failure – Software failure <p>NOTE: Three different types of human error can be awarded e.g. accidental deletion, not saving data, incorrect shutdown procedure</p>	3
3(a)(ii)	<ul style="list-style-type: none"> – Create a backup 	1
3(b)	<p>Max three from:</p> <ul style="list-style-type: none"> – Solid state drive – Non-volatile – Secondary storage – Flash memory – Has no mechanical/moving parts – Uses transistors – ... and cells that are laid out in a grid – Uses control gates and floating gates – Can be NAND/NOR (technology) – Use EEPROM technology <p>Max two from:</p> <ul style="list-style-type: none"> – Stores data by flashing it onto the chips – Data stored by controlling the flow of electrons through/using transistors/chips/gates – The electric current reaches the control gate and flows through to the floating gate to be stored – When data is stored the transistor is converted from 1 to 0 	4

Question	Answer	Marks																												
3(c)	<p data-bbox="229 143 507 170">One mark for each correct row:</p> <table border="1" data-bbox="229 188 823 519"> <thead> <tr> <th data-bbox="229 188 557 255">Statement</th> <th data-bbox="557 188 655 255">Blu-ray (✓)</th> <th data-bbox="655 188 738 255">CD (✓)</th> <th data-bbox="738 188 823 255">DVD (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="229 255 557 300">A type of optical storage</td> <td data-bbox="557 255 655 300">✓</td> <td data-bbox="655 255 738 300">✓</td> <td data-bbox="738 255 823 300">✓</td> </tr> <tr> <td data-bbox="229 300 557 344">Has the largest storage capacity</td> <td data-bbox="557 300 655 344">✓</td> <td data-bbox="655 300 738 344"></td> <td data-bbox="738 300 823 344"></td> </tr> <tr> <td data-bbox="229 344 557 389">Can be dual layer</td> <td data-bbox="557 344 655 389">✓</td> <td data-bbox="655 344 738 389"></td> <td data-bbox="738 344 823 389">✓</td> </tr> <tr> <td data-bbox="229 389 557 434">Read using a red laser</td> <td data-bbox="557 389 655 434"></td> <td data-bbox="655 389 738 434">✓</td> <td data-bbox="738 389 823 434">✓</td> </tr> <tr> <td data-bbox="229 434 557 479">Has the smallest storage capacity</td> <td data-bbox="557 434 655 479"></td> <td data-bbox="655 434 738 479">✓</td> <td data-bbox="738 434 823 479"></td> </tr> <tr> <td data-bbox="229 479 557 519">Stores data in a spiral track</td> <td data-bbox="557 479 655 519">✓</td> <td data-bbox="655 479 738 519">✓</td> <td data-bbox="738 479 823 519">✓</td> </tr> </tbody> </table>	Statement	Blu-ray (✓)	CD (✓)	DVD (✓)	A type of optical storage	✓	✓	✓	Has the largest storage capacity	✓			Can be dual layer	✓		✓	Read using a red laser		✓	✓	Has the smallest storage capacity		✓		Stores data in a spiral track	✓	✓	✓	6
Statement	Blu-ray (✓)	CD (✓)	DVD (✓)																											
A type of optical storage	✓	✓	✓																											
Has the largest storage capacity	✓																													
Can be dual layer	✓		✓																											
Read using a red laser		✓	✓																											
Has the smallest storage capacity		✓																												
Stores data in a spiral track	✓	✓	✓																											

Question	Answer	Marks
4(a)	<p data-bbox="231 145 715 174">One mark for each correct logic gate with correct input:</p>  <pre data-bbox="231 179 957 515">graph LR; A --- G1; B --- G1; B --- G2; C --- G2; G1 --- G3; G2 --- G3; G3 --- G4; G4 --- X</pre>	4

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="229 257 895 651"> <thead> <tr> <th data-bbox="229 257 284 295">A</th> <th data-bbox="284 257 338 295">B</th> <th data-bbox="338 257 392 295">C</th> <th data-bbox="392 257 842 295">Working space</th> <th data-bbox="842 257 895 295">X</th> </tr> </thead> <tbody> <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>1</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>1</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> </tbody> </table>	A	B	C	Working space	X	0	0	0		0	0	0	1		1	0	1	0		0	0	1	1		1	1	0	0		0	1	0	1		1	1	1	0		1	1	1	1		1	4
A	B	C	Working space	X																																											
0	0	0		0																																											
0	0	1		1																																											
0	1	0		0																																											
0	1	1		1																																											
1	0	0		0																																											
1	0	1		1																																											
1	1	0		1																																											
1	1	1		1																																											

Question	Answer	Marks																		
5(a)	<p>One mark for each correct row:</p> <table border="1" data-bbox="229 188 991 479"> <thead> <tr> <th data-bbox="229 188 836 255">Statement</th> <th data-bbox="836 188 911 255">True (✓)</th> <th data-bbox="911 188 991 255">False (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="229 255 836 300">It is a flat panel display</td> <td data-bbox="836 255 911 300">✓</td> <td data-bbox="911 255 991 300"></td> </tr> <tr> <td data-bbox="229 300 836 344">It creates images using red, green and blue diodes</td> <td data-bbox="836 300 911 344">✓</td> <td data-bbox="911 300 991 344"></td> </tr> <tr> <td data-bbox="229 344 836 389">It is not very energy efficient and gives off heat</td> <td data-bbox="836 344 911 389"></td> <td data-bbox="911 344 991 389">✓</td> </tr> <tr> <td data-bbox="229 389 836 434">It is also used in mobile devices such as smartphones and tablets</td> <td data-bbox="836 389 911 434">✓</td> <td data-bbox="911 389 991 434"></td> </tr> <tr> <td data-bbox="229 434 836 479">It is a front-lit display</td> <td data-bbox="836 434 911 479"></td> <td data-bbox="911 434 991 479">✓</td> </tr> </tbody> </table>	Statement	True (✓)	False (✓)	It is a flat panel display	✓		It creates images using red, green and blue diodes	✓		It is not very energy efficient and gives off heat		✓	It is also used in mobile devices such as smartphones and tablets	✓		It is a front-lit display		✓	5
Statement	True (✓)	False (✓)																		
It is a flat panel display	✓																			
It creates images using red, green and blue diodes	✓																			
It is not very energy efficient and gives off heat		✓																		
It is also used in mobile devices such as smartphones and tablets	✓																			
It is a front-lit display		✓																		
5(b)	<p>One mark for each correct term in the correct place:</p> <ul style="list-style-type: none"> – Control – Unique – Identify – Protocol – Dynamic 	5																		

Question	Answer	Marks
5(c)	Any four from: <ul style="list-style-type: none">– Allows user to view web pages– Renders HTML– Allows user to bookmark/favourite web pages– Provides navigation features– Allows (multiple) tabs– Stores cookies– Records history of pages visited– Has a homepage– Runs active script– Allows files to be downloaded from website/internet– Sends a request to the IP address/web server (to obtain the contents of a web page)– Sends URL to DNS– Manages HTTP/HTTPS protocol	4