
COMPUTER SCIENCE

0478/11

Paper 1

October/November 2018

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 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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(a)	<p>1 mark for each correct line (to a maximum of 3)</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center; width: 50%;">File format</td> <td style="text-align: center; width: 50%;">File type</td> </tr> <tr> <td style="text-align: center;">.jpeg</td> <td style="text-align: center;">Text file</td> </tr> <tr> <td style="text-align: center;">.mp3</td> <td style="text-align: center;">Image file</td> </tr> <tr> <td style="text-align: center;">.mp4</td> <td style="text-align: center;">Audio file</td> </tr> <tr> <td style="text-align: center;">.txt</td> <td style="text-align: center;">Video file</td> </tr> </table>	File format	File type	.jpeg	Text file	.mp3	Image file	.mp4	Audio file	.txt	Video file	3
File format	File type											
.jpeg	Text file											
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.mp4	Audio file											
.txt	Video file											
1(b)	<p>2 marks for working, 1 mark for correct answer</p> <ul style="list-style-type: none"> • $150 \times 100 = 15\,000$ • $15\,000 / 1024$ • 14.65kB 	3										
1(c)	<p>Three from:</p> <ul style="list-style-type: none"> • a compression algorithm is used • no data is lost in the process • repeated words/patterns can be indexed // repeated sections of words/patterns can be indexed // given by example • The indexed words/patterns can be replaced with numerical values // given by example 	3										

Question	Answer	Marks															
1(d)	<p>1 mark for each correct tick (✓)</p> <table border="1" data-bbox="761 247 1512 609"> <thead> <tr> <th data-bbox="761 247 1064 347">File format</th> <th data-bbox="1064 247 1288 347">Lossy (✓)</th> <th data-bbox="1288 247 1512 347">Lossless (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="761 347 1064 411">.jpeg</td> <td data-bbox="1064 347 1288 411">✓</td> <td data-bbox="1288 347 1512 411"></td> </tr> <tr> <td data-bbox="761 411 1064 475">.mp3</td> <td data-bbox="1064 411 1288 475">✓</td> <td data-bbox="1288 411 1512 475"></td> </tr> <tr> <td data-bbox="761 475 1064 539">.mp4</td> <td data-bbox="1064 475 1288 539">✓</td> <td data-bbox="1288 475 1512 539"></td> </tr> <tr> <td data-bbox="761 539 1064 609">.zip</td> <td data-bbox="1064 539 1288 609"></td> <td data-bbox="1288 539 1512 609">✓</td> </tr> </tbody> </table>	File format	Lossy (✓)	Lossless (✓)	.jpeg	✓		.mp3	✓		.mp4	✓		.zip		✓	4
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Question	Answer	Marks														
<p>2(a)</p>	<p>1 mark for each correct line (to a maximum of 5)</p> <table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">Binary or hexadecimal</td> <td style="width: 50%;">Denary</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">01001011</td> <td style="border: 1px solid black; padding: 5px;">75</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">4E</td> <td style="border: 1px solid black; padding: 5px;">78</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">11011010</td> <td style="border: 1px solid black; padding: 5px;">157</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">10011101</td> <td style="border: 1px solid black; padding: 5px;">167</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">A7</td> <td style="border: 1px solid black; padding: 5px;">25</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">19</td> <td style="border: 1px solid black; padding: 5px;">218</td> </tr> </table>	Binary or hexadecimal	Denary	01001011	75	4E	78	11011010	157	10011101	167	A7	25	19	218	<p>5</p>
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<p>2(b)</p>	<p>Two from:</p> <ul style="list-style-type: none"> • It makes the values easier to read/write/understand/debug • It is a shorter way to represent the values 	<p>2</p>														

Question	Answer	Marks																																													
3(a)	<ul style="list-style-type: none"> • 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 <table border="1" data-bbox="629 392 1646 983" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>Working space</th> <th>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>1</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>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		1	0	0	1		1	0	1	0		1	0	1	1		1	1	0	0		0	1	0	1		1	1	1	0		1	1	1	1		1	4
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3(b)	<p>Three from:</p> <ul style="list-style-type: none"> • output of AND is 1 if both inputs are 1 • output of AND is 0 if either or both inputs are 0 • output of OR is 1 if either input is 1 • output of OR is 0 if both inputs are 0 • correct example of AND truth table • correct example of OR truth table 	3																																													

Question	Answer	Marks
4(a)	<p>Four from:</p> <p>Phishing:</p> <ul style="list-style-type: none"> • A legitimate looking email is sent to a user • The email will encourage the user to click a link/open an attachment • The link will redirect a user to a legitimate looking webpage (to steal personal data) <p>Pharming:</p> <ul style="list-style-type: none"> • A malicious code is installed on a user's hard drive/server • The code will cause a redirection to a legitimate looking webpage (to steal personal data) 	4
4(b)	<p>Two from:</p> <ul style="list-style-type: none"> • Hacking • Cracking • Virus • Denial of service • Malware • Spyware 	2
4(c)	<p>Two from:</p> <ul style="list-style-type: none"> • Firewall • Proxy server • Anti-virus • Anti-malware • Anti-spyware • Username and password 	2

Question	Answer	Marks																								
5(a)	<p>1 mark for the correct tick for each storage</p> <table border="1" data-bbox="584 248 1688 676"> <thead> <tr> <th data-bbox="584 248 1093 347">Storage device or media</th> <th data-bbox="1093 248 1301 347">Primary (✓)</th> <th data-bbox="1301 248 1509 347">Secondary (✓)</th> <th data-bbox="1509 248 1688 347">Off-line (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="584 347 1093 413">External HDD</td> <td data-bbox="1093 347 1301 413"></td> <td data-bbox="1301 347 1509 413"></td> <td data-bbox="1509 347 1688 413">✓</td> </tr> <tr> <td data-bbox="584 413 1093 478">RAM</td> <td data-bbox="1093 413 1301 478">✓</td> <td data-bbox="1301 413 1509 478"></td> <td data-bbox="1509 413 1688 478"></td> </tr> <tr> <td data-bbox="584 478 1093 544">Internal SSD</td> <td data-bbox="1093 478 1301 544"></td> <td data-bbox="1301 478 1509 544">✓</td> <td data-bbox="1509 478 1688 544"></td> </tr> <tr> <td data-bbox="584 544 1093 609">ROM</td> <td data-bbox="1093 544 1301 609">✓</td> <td data-bbox="1301 544 1509 609"></td> <td data-bbox="1509 544 1688 609"></td> </tr> <tr> <td data-bbox="584 609 1093 676">DVD</td> <td data-bbox="1093 609 1301 676"></td> <td data-bbox="1301 609 1509 676"></td> <td data-bbox="1509 609 1688 676">✓</td> </tr> </tbody> </table>	Storage device or media	Primary (✓)	Secondary (✓)	Off-line (✓)	External HDD			✓	RAM	✓			Internal SSD		✓		ROM	✓			DVD			✓	5
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5(b)	<p>Four from:</p> <ul style="list-style-type: none"> • The disc is rotated/spun • Laser beam is used • The laser beam makes indentations on the surface of the disc/pits and lands • The data is written in a spiral/concentric tracks • The pits and lands represent binary values/1s and 0s • It is called burning data to the disc 	4																								
5(c)(i)	Solid state	1																								
5(c)(ii)	<p>Two from:</p> <ul style="list-style-type: none"> • It has no moving parts so will be durable • It is small/compact so it can be easily fit onto the device • It is light so it will not be difficult to lift for the drone • It can hold the large amount of data needed for the video/film footage • Uses less power so drone battery will last longer 	2																								

Question	Answer	Marks															
6(a)	<p>1 mark for the correct ticks (✓) for each statement</p> <table border="1" data-bbox="535 284 1736 644"> <thead> <tr> <th data-bbox="535 284 1328 381">Statement</th> <th data-bbox="1328 284 1536 381">3D printer (✓)</th> <th data-bbox="1536 284 1736 381">3D cutter (✓)</th> </tr> </thead> <tbody> <tr> <td data-bbox="535 381 1328 448">Outputs a physical 3D product</td> <td data-bbox="1328 381 1536 448">✓</td> <td data-bbox="1536 381 1736 448">✓</td> </tr> <tr> <td data-bbox="535 448 1328 515">Uses a high powered laser to create the output</td> <td data-bbox="1328 448 1536 515"></td> <td data-bbox="1536 448 1736 515">✓</td> </tr> <tr> <td data-bbox="535 515 1328 582">Creates 3D prototypes</td> <td data-bbox="1328 515 1536 582">✓</td> <td data-bbox="1536 515 1736 582">✓</td> </tr> <tr> <td data-bbox="535 582 1328 644">Uses layers of material to create the output</td> <td data-bbox="1328 582 1536 644">✓</td> <td data-bbox="1536 582 1736 644"></td> </tr> </tbody> </table>	Statement	3D printer (✓)	3D cutter (✓)	Outputs a physical 3D product	✓	✓	Uses a high powered laser to create the output		✓	Creates 3D prototypes	✓	✓	Uses layers of material to create the output	✓		4
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Uses layers of material to create the output	✓																
6(b)	Computer Aided Design/CAD	1															
6(c)	<p>Three from:</p> <ul style="list-style-type: none"> • Uses a large number of tiny mirrors • Mirrors are laid out in a grid/matrix • Each mirror creates a pixel in the image • Mirrors can tilt toward or away from light source • The mirrors reflect light toward a (projection) lens • Colour is produced using a colour wheel // Light passes through colour wheel // filters light into red/green/blue • Can be used to display an image on a wall/screen 	3															

Question	Answer	Marks
7(a)	1 mark for each correct answer: <ul style="list-style-type: none"> • uses several/multiple wires • transmits multiple bits at a time 	2
7(b)	Benefit 1 mark for: <ul style="list-style-type: none"> • quicker/faster data transfer Drawback One from: <ul style="list-style-type: none"> • More chance of data being skewed due to bits being sent simultaneously/out of order // less safe transmission as bits are sent simultaneously/out of order • More expensive as requires more/several/multiple wires • More chance of interference as more/several/multiple wires are used (than can create crosstalk) 	2
7(c)	One from: <ul style="list-style-type: none"> • Used in integrated circuits • Used in RAM • Used in connections to peripheral devices (e.g. printer) 	1

Question	Answer	Marks
8	1 mark for each correct answer, in the given order: <ul style="list-style-type: none"> • browser • webpages • Internet Service Provider (ISP) • Internet • protocol • IP address 	6

Question	Answer	Marks
9	<p>Five from:</p> <ul style="list-style-type: none"> • The data is sent to the microprocessor • The analogue data is converted to digital (using ADC) • The microprocessor compares the data to a stored value of 5 kg ... <ul style="list-style-type: none"> – ... If the value is greater than 5 kg ... – ... a counter is added to/incremented • The process is continuous 	5

Question	Answer	Marks
10	<p>Four from:</p> <ul style="list-style-type: none"> • It performs a number of basic tasks, including controlling hardware/file handling (any other suitable examples) • It allows the user to communicate with the computer using hardware // without it the user would not be able to communicate with the computer using hardware • It provides the user with a user interface // without it the user would not have a user interface to use • PC's are often used to perform many complex tasks at a time ... <ul style="list-style-type: none"> – ... the OS is needed to handle this multitasking – ... therefore, it provides the ability to handle interrupts 	4