
COMPUTER SCIENCE**0478/13**

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														
<p>1</p>	<p>1 mark for each correct line, maximum 5 marks</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 50%;">Device</th> <th style="text-align: center; width: 50%;">Description</th> </tr> </thead> <tbody> <tr> <td style="border: 1px solid black; text-align: center; padding: 10px;">Laser Printer</td> <td style="border: 1px solid black; text-align: center; padding: 10px;">Uses a high-intensity beam of light shone through three layers of changing pixels</td> </tr> <tr> <td style="border: 1px solid black; text-align: center; padding: 10px;">LCD Projector</td> <td style="border: 1px solid black; text-align: center; padding: 10px;">Uses millions of micro mirrors to reflect light through a lens</td> </tr> <tr> <td style="border: 1px solid black; text-align: center; padding: 10px;">Digital Light Projector (DLP)</td> <td style="border: 1px solid black; text-align: center; padding: 10px;">Uses plastic, resin or powdered metal to generate a physical output</td> </tr> <tr> <td style="border: 1px solid black; text-align: center; padding: 10px;">Inkjet Printer</td> <td style="border: 1px solid black; text-align: center; padding: 10px;">Uses a static electric charge on a rotating drum to generate a physical output</td> </tr> <tr> <td style="border: 1px solid black; text-align: center; padding: 10px;">3D Printer</td> <td style="border: 1px solid black; text-align: center; padding: 10px;">Uses liquid ink to generate a physical output</td> </tr> <tr> <td style="border: 1px solid black; text-align: center; padding: 10px;">2D Cutter</td> <td style="border: 1px solid black; text-align: center; padding: 10px;">Uses a high-power laser to generate a physical output</td> </tr> </tbody> </table>	Device	Description	Laser Printer	Uses a high-intensity beam of light shone through three layers of changing pixels	LCD Projector	Uses millions of micro mirrors to reflect light through a lens	Digital Light Projector (DLP)	Uses plastic, resin or powdered metal to generate a physical output	Inkjet Printer	Uses a static electric charge on a rotating drum to generate a physical output	3D Printer	Uses liquid ink to generate a physical output	2D Cutter	Uses a high-power laser to generate a physical output	<p>5</p>
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Question	Answer	Marks																																				
2(a)	2 marks for 3 correct bits, 1 mark for 2 correct bits <table border="1" data-bbox="721 284 1552 544"> <thead> <tr> <th data-bbox="721 284 875 347">Parity Bit</th> <th data-bbox="875 284 965 347"></th> <th data-bbox="965 284 1055 347"></th> <th data-bbox="1055 284 1144 347"></th> <th data-bbox="1144 284 1234 347"></th> <th data-bbox="1234 284 1323 347"></th> <th data-bbox="1323 284 1413 347"></th> <th data-bbox="1413 284 1503 347"></th> <th data-bbox="1503 284 1592 347"></th> </tr> </thead> <tbody> <tr> <td data-bbox="721 347 875 411">0</td> <td data-bbox="875 347 965 411">1</td> <td data-bbox="965 347 1055 411">0</td> <td data-bbox="1055 347 1144 411">1</td> <td data-bbox="1144 347 1234 411">0</td> <td data-bbox="1234 347 1323 411">0</td> <td data-bbox="1323 347 1413 411">1</td> <td data-bbox="1413 347 1503 411">1</td> <td data-bbox="1503 347 1592 411"></td> </tr> <tr> <td data-bbox="721 411 875 475">0</td> <td data-bbox="875 411 965 475">1</td> <td data-bbox="965 411 1055 475">0</td> <td data-bbox="1055 411 1144 475">1</td> <td data-bbox="1144 411 1234 475">1</td> <td data-bbox="1234 411 1323 475">1</td> <td data-bbox="1323 411 1413 475">1</td> <td data-bbox="1413 411 1503 475">1</td> <td data-bbox="1503 411 1592 475"></td> </tr> <tr> <td data-bbox="721 475 875 544">1</td> <td data-bbox="875 475 965 544">1</td> <td data-bbox="965 475 1055 544">0</td> <td data-bbox="1055 475 1144 544">1</td> <td data-bbox="1144 475 1234 544">0</td> <td data-bbox="1234 475 1323 544">0</td> <td data-bbox="1323 475 1413 544">0</td> <td data-bbox="1413 475 1503 544">0</td> <td data-bbox="1503 475 1592 544">1</td> </tr> </tbody> </table>	Parity Bit									0	1	0	1	0	0	1	1		0	1	0	1	1	1	1	1		1	1	0	1	0	0	0	0	1	2
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2(b)	Two from: <ul style="list-style-type: none"> • Set of rules for controlling error checking/detection // it's an error detection method // used to detect errors • Uses acknowledgement and timeout • Request is sent (with data) requiring acknowledgement • If no response/acknowledgment within certain time frame data package is resent • When data received contains an error a request is sent (automatically) to resend the data • The resend request is repeatedly sent until packet is received error free/limit is reached/acknowledgement received 	2																																				
2(c)	Checksum	1																																				

Question	Answer	Marks
3	Six from: <ul style="list-style-type: none"> • A <u>pressure sensor</u> is used • The sensor sends data/signals to the microprocessor • Data is <u>converted to digital</u> format • Microprocessor compares data value against set value • If value <u>≤ 2400 Kg/under weight limit</u> lift is permitted to operate • If value <u>> 2400 Kg/over weight limit</u> signal is sent from the microprocessor to deliver warning message to passengers • If value <u>> 2400 Kg</u> signal is sent from the microprocessor to lift mechanism to stop lift operating • Weight continuously monitored 	6

Question	Answer	Marks				
4(a)	1 mark for each correct conversion <table border="1" data-bbox="537 247 1736 316"> <tr> <td data-bbox="537 247 840 316">01101010</td> <td data-bbox="840 247 1137 316">11111111</td> <td data-bbox="1137 247 1435 316">00001000</td> <td data-bbox="1435 247 1736 316">10010011</td> </tr> </table>	01101010	11111111	00001000	10010011	3
01101010	11111111	00001000	10010011			
4(b)	<ul style="list-style-type: none"> • Computers use switches / logic gates • Only uses 2 states / On or Off / 1 or 0 	2				

Question	Answer	Marks
5(a)	<ul style="list-style-type: none"> • Bits sent one at a time • Uses a single wire 	2
5(b)	USB / SATA / Wifi / PCI <u>Express</u> / Any appropriate serial device	1
5(c)	<ul style="list-style-type: none"> • Data is transferred in two directions • Data is sent in only one direction at a time 	2

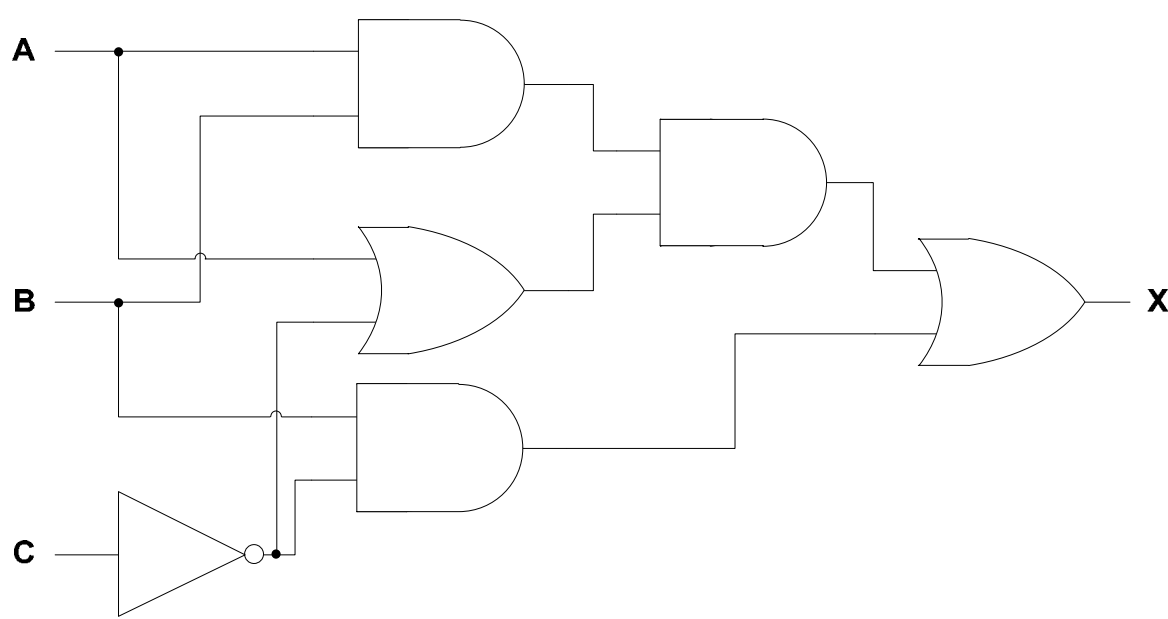
Question	Answer	Marks
6	<p>1 mark for method name, 1 mark for description e.g.</p> <p>Backups</p> <ul style="list-style-type: none"> • Make a copy of the data • Copy stored away from main computer • Data can be restored from backup <p>Anti-virus</p> <ul style="list-style-type: none"> • Scans computer for viruses • Software to detect/remove viruses • Can prevent data being corrupted by viruses <p>Firewall</p> <ul style="list-style-type: none"> • Hardware or software that monitors network traffic • To help prevent hackers gaining access / deleting data <p>Password/Biometrics</p> <ul style="list-style-type: none"> • To help protect files / computer from unauthorised access <p>Restricted access</p> <ul style="list-style-type: none"> • To stop users downloading/installing software that could harm <p>Verification</p> <ul style="list-style-type: none"> • Message e.g. to ask if definitely want to delete <p>Physical methods</p> <ul style="list-style-type: none"> • Locks/alarms/CCTV to alert/deter unauthorised access 	6

Question	Answer	Marks
7(a)	<p>Three from:</p> <ul style="list-style-type: none"> • It is a translator • Translates (high level language) to low level language • Executes one line at a time • Translates source code line by line • Runs error diagnostic • Produces error messages to tell user location of error • Stops execution when encounters errors • Continues translating when an error is fixed 	3
7(b)	<p>Four from (Max three per benefit):</p> <ul style="list-style-type: none"> • Produces executable file ... • ... this creates a smaller file size • ... more saleable • Program will be machine independent / portable ... • ... this means it can be used on any hardware • No need for compiler to run executable file ... • ... this means it will be quicker to run • ... customers can just execute the program • Source code cannot be accessed ... • ... therefore, code cannot be stolen / plagiarised 	4
7(c)	<p>Three from:</p> <ul style="list-style-type: none"> • Uses compression algorithm / by example e.g. RLE • Repeating words / phrases / patterns identified... • ... replaced with value • File / dictionary / index of phrases created • Index will store word/phrase with value 	3

Question	Answer	Marks
8(a)	Uniform Resource Locator	1
8(b)	Four from: <ul style="list-style-type: none"> • The web browser sends URL to DNS • DNS stores an index of URL and matching IP address • DNS searches for URL to obtain the IP address • IP address sent to web browser, (if found) • Web browser sends request to IP of webserver • Webserver sends web page to web browser • Web browser interprets HTML to display web page • If URL not found DNS returns error 	4

Question	Answer	Marks
9	Four from: <ul style="list-style-type: none"> • ROM is permanent ... • ... RAM is temporary • ROM is non-volatile • ... RAM is volatile ... • ROM is read only ... • ... RAM can have read/write operations • ROM holds instructions for boot up ... • ... RAM holds files / instructions in use 	4

Question	Answer	Marks																																				
10(a)	<p>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</p> <table border="1" data-bbox="882 352 1393 997"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	A	B	C	X	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	1	1	0	0	0	1	0	1	1	1	1	0	0	1	1	1	0	4
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Question	Answer	Marks
10(b)	<p>1 mark per correct gate with correct inputs.</p> 	6

Question	Answer	Marks
11(a)	<ul style="list-style-type: none"> • Holds address of next/current instruction ... • ... to be fetched/processed/executed 	2
11(b)	<ul style="list-style-type: none"> • Stores data/instruction that is in use ... • ... from address in MAR 	2

Question	Answer	Marks
12	<p>Four from (Max three from each):</p> <p>MP3</p> <ul style="list-style-type: none"> • Digital recording of sound • Produced by recording software / microphone • Used when distributing sound files • Compressed file format <p>MIDI</p> <ul style="list-style-type: none"> • Instructions of how to make sound • Non-audio recording • File created using digital musical instruments • Produced by synthesizer • Used when composing music • Individual notes/instruments can be changed 	4

Question	Answer	Marks
13(a)	<p>1 mark for storage, 1 mark for justification</p> <ul style="list-style-type: none"> • External/Removable HDD // External/Removable SSD // Large capacity USB Flash Drive • Backups must be stored separately • Will hold sufficient data • Faster write abilities (SSD/USB drive only) 	2

Question	Answer	Marks
13(b)	1 mark for storage, 1 mark for justification <ul style="list-style-type: none">• SSD // SD card // Flash memory• Small physical size• Lightweight• Low heat production• Low power consumption• It's quiet• Fast read/write times	2
13(c)	1 mark for storage, 1 mark for justification <ul style="list-style-type: none">• DVD // Blu-ray // USB Flash Drive // SD card• Easy to distribute• Small in size• Cheap to buy• Universal storage therefore compatible with many devices	2