



COMPUTER SCIENCE

0478/12

Paper 1

October/November 2017

MARK SCHEME

Maximum Mark: 75

Published

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This document consists of **9** printed pages.

Question	Answer	Marks
1	1 mark per correct instruction: 9 – LEFT 1 – DOWN C – OPEN 3 – CLOSE F – UP	5

Question	Answer	Marks
2	1 mark for each correct category: <i>HDD</i> – Secondary <i>RAM</i> – Primary <i>ROM</i> – Primary <i>CD-ROM</i> – Off-line <i>SSD</i> – Secondary <i>DVD-RAM</i> – Off-line	6

Question	Answer	Marks
3(a)	Any four from (Max 2 per number system) : A binary number system is a base-2 system A denary number system is a base-10 system A binary number system uses 0 and 1 values A denary number system uses 0 to 9 values A binary number system has units/ placeholders/column headings that increase by the power of 2 A denary number system has units/ placeholders/column headings that increase by the power of 10 Binary has more digit <u>for the same value</u> // Denary has less digits <u>for the same value</u>	4

Question	Answer	Marks
3(b)	<p>Five from:</p> <p>Correct column headings / place holders by example</p> <p>Correctly place a 1 or a 0 for each column</p> <p>Identify the columns to be added</p> <p>Add together the (denary) values identified ...</p> <p>... this will give a total which is the denary number/answer</p> <p>Answer is 10</p>	5

Question	Answer	Marks																
4(a)(i)	<table border="1"> <thead> <tr> <th>Method 1</th> <th>Tick (✓)</th> <th>Method 2</th> <th>Tick (✓)</th> </tr> </thead> <tbody> <tr> <td>Serial</td> <td>✓</td> <td>Simplex</td> <td></td> </tr> <tr> <td>Parallel</td> <td></td> <td>Half-duplex</td> <td></td> </tr> <tr> <td></td> <td></td> <td>Duplex</td> <td>✓</td> </tr> </tbody> </table>	Method 1	Tick (✓)	Method 2	Tick (✓)	Serial	✓	Simplex		Parallel		Half-duplex				Duplex	✓	2
Method 1	Tick (✓)	Method 2	Tick (✓)															
Serial	✓	Simplex																
Parallel		Half-duplex																
		Duplex	✓															
4(a)(ii)	<p>Any four from (Max 3 for serial):</p> <p>Serial has <u>less/lower</u> interference</p> <p>Serial is (more) reliable/accurate <u>over distances</u></p> <p>In serial the bits won't be skewed</p> <p>In serial it is easier to collate the bits together again after transmission</p> <p>Duplex transmits data in both directions <u>at the same time</u></p> <p>simplex/half-duplex/remaining methods won't allow read and write at same time</p>	4																

Question	Answer	Marks
4(b)	<p>1 mark for error checking method, 2 marks for description:</p> <p>Checksum A value is calculated from the data // Description of calculation Value is transmitted with data Value is recalculated after transmission If the values match the data is (more likely to be) accurate</p> <p>Parity check A parity bit is transmitted with each byte of data Odd or even (parity can be used) Counts / checks number of 1's // counts / checks to see if 1's are even // counts / checks to see if 1's are odd (Each byte is) checked after transmission to see if it matches the odd/even parity used</p> <p>Automatic Repeat Request (ARQ) Uses acknowledgement and timeout When a device detects an error in data transmission it asks for the packet to be resent / no error detected, positive acknowledgment sent The sending device resends the packet after the request to resend/ timeout received This process is continuous until the packet received is correct/until the ARQ limit is reached</p> <p>Echo (check) Copy of data is sent back to sender Data is compared to see if it matches If it does not match error detected</p>	6

Question	Answer	Marks
5(a)	Any four from: Data / files Stored in a <u>text file</u> Downloaded to a user's computer when a website is visited // webserver sends to web browser Stored on a user's computer Stored by a browser Detected by the website when it is visited again	4
5(b)	Any two from: e.g. To store personal information/data To store login details To save items in an online shopping basket To track/save internet surfing habits // to track website traffic To carry out targeted advertising To store payment details To customise a webpage // to store user preferences Store progress in online games/quizzes	2

Question	Answer	Marks
6	1 mark for each correct term, in this order: Interrupt Compiler ALU/Arithmetic and Logic Unit ARQ/Automatic repeat request	4

Question	Answer	Marks
7	<p>1 mark for each correct logic gate with the correct input(s)</p>	7

Question	Answer	Marks
8(a)	1 mark for correct calculation method, 1 mark for correct answer: 2048/1024 (or $1024 \cdot 2$) 2 GB	2
8(b)	Instructions/programs/data ... currently in use	2
8(c)	Any three from: RAM is volatile, ROM is non-volatile RAM is temporary, ROM is (semi) permanent RAM normally has a larger capacity than ROM RAM can be edited ROM cannot be edited // Data can be read from and written to RAM, ROM can only be read from.	3

Question	Answer	Marks
9(a)	It is an <u>input</u> device It measures/takes (physical) readings of the surrounding environment / environment by example / physical properties	2
9(b)	<p>1 mark for each sensor, 2 marks for each description:</p> <p>Moisture (sensor) To measure the water content of the soil To alert when the soil is too dry or too wet/needs watering</p> <p>pH (sensor) To measure how acidic/alkaline the soil is To alert when there may be something polluting the soil</p> <p>Light (sensor) To measure the brightness of the environment To alert when the fruit has too little/too much light</p> <p>Temperature (sensor) To measure the temperature of the environment To alert when it is too hot/too cold for the fruit to grow</p> <p>Gas (sensor) To measure the amount of CO₂/oxygen present To alert when too much CO₂/oxygen present</p> <p>Humidity (sensor) To measure the water content in the air To alert when the air is too dry</p> <p>Infra-red / motion (sensor) To measure level of infra-red/microwaves deflected To alert to any intruders e.g. animals stealing the fruit</p>	6

Question	Answer	Marks
10(a)	Any three from: It is a (security) protocol It encrypts data (sent over the web/network) It is the updated version of SSL It has <u>two</u> layers It has a handshake layer It has a record layer	3
10(b)	1 mark for each correct application, examples could include: Online banking Online shopping // Online payment systems Email Cloud based storage Intranet/extranet VPN VoIP Instant messaging (IM) // social networking	3

Question	Answer	Marks
11	1 mark for each correct missing word, in the correct order: Plagiarism Free software Freeware Shareware Ethics	5