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**COMPUTER SCIENCE**

**0478/13**

Paper 1

**May/June 2017**

MARK SCHEME

Maximum Mark: 75

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**Published**

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This document consists of **8** printed pages.

Question	Answer	Marks
1(a)	1 mark for <b>any</b> two correct values, 2 marks for all 4 correct values. 29FC	<b>2</b>
1(b)	<b>Two</b> from: <ul style="list-style-type: none"> <li>• Easier/quicker to understand/read</li> <li>• Easier to debug/identify errors</li> <li>• Fewer digits are used / shorter // takes up less space on screen // more can be shown on screen / page</li> </ul>	<b>2</b>
1(c)	<b>Two</b> from: <ul style="list-style-type: none"> <li>• Notations for colour in HTML // HTML colour (codes)</li> <li>• Error messages</li> <li>• MAC address // IP address</li> <li>• Locations in memory</li> <li>• Memory dump</li> </ul>	<b>2</b>

Question	Answer	Marks
2(a)	<b>Two</b> from: <ul style="list-style-type: none"> <li>• Closer to human language // closer to English</li> <li>• Independent of a particular type of computer/device/platform // portable language</li> <li>• A language such as Python, Java, Pascal, etc. (any suitable example)</li> </ul>	<b>2</b>
2(b)	<b>One</b> from: <ul style="list-style-type: none"> <li>• Compiler</li> <li>• Interpreter</li> </ul>	<b>1</b>
2(c)	Must relate to answer given in 2b. No follow through for incorrect answer in part 2b.  <b>Compiler – Three</b> from: <ul style="list-style-type: none"> <li>• Translates the whole program as a complete unit / at once</li> <li>• Creates an executable file / object code</li> <li>• A report / list of errors in the code is created</li> <li>• Optimises the source code (to run efficiently)</li> </ul> <b>Interpreter – Three</b> from: <ul style="list-style-type: none"> <li>• Translates a program one line of code at a time</li> <li>• Machine code is directly executed // The interpreter is used each time the program / code is executed</li> <li>• Will identify an error as soon as it finds one in a line of code</li> </ul>	<b>3</b>

Question	Answer	Marks															
3	1 mark per correct tick	4															
<table border="1"> <thead> <tr> <th>Statement</th> <th>true (✓)</th> <th>false (✓)</th> </tr> </thead> <tbody> <tr> <td>47KB is larger than 10MB.</td> <td></td> <td>✓</td> </tr> <tr> <td>250bytes is smaller than 0.5MB.</td> <td>✓</td> <td></td> </tr> <tr> <td>50GB is larger than 100MB.</td> <td>✓</td> <td></td> </tr> <tr> <td>1TB is smaller than 4GB.</td> <td></td> <td>✓</td> </tr> </tbody> </table>			Statement	true (✓)	false (✓)	47KB is larger than 10MB.		✓	250bytes is smaller than 0.5MB.	✓		50GB is larger than 100MB.	✓		1TB is smaller than 4GB.		✓
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5(a)	1 mark per correct tick <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Received byte</th> <th>corrupted during transmission (✓)</th> <th>not corrupted during transmission (✓)</th> </tr> </thead> <tbody> <tr> <td>10110100</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>01101101</td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>10000001</td> <td style="text-align: center;">✓</td> <td></td> </tr> </tbody> </table>	Received byte	corrupted during transmission (✓)	not corrupted during transmission (✓)	10110100	✓		01101101		✓	10000001	✓		<b>3</b>
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10110100	✓													
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5(b)	<p><b>Four</b> from:</p> <ul style="list-style-type: none"> <li>• Uses acknowledgement and time out</li> <li>• Check performed on received data // error is detected by e.g. parity check, check sum</li> <li>• If error detected, request sent to resend data // negative acknowledgment is used</li> <li>• If no acknowledgement is sent that data is received // positive acknowledgement is used</li> <li>• Data is resent / Resend request repeated, till data is resent correctly ...</li> <li>• ... or request times out // limit is reached</li> </ul>	<b>4</b>												

Question	Answer	Marks
6	<p>1 mark for correct bus name and up to 2 further marks for appropriate purpose.</p> <p><b>Address (bus)</b>  <b>Two</b> from:</p> <ul style="list-style-type: none"> <li>• Carries / transports an address / location ...</li> <li>• ... of the next item to be fetched</li> <li>• Data travels one way (unidirectional)</li> </ul> <p><b>Data (bus)</b>  <b>Two</b> from:</p> <ul style="list-style-type: none"> <li>• Carries / transports data / example of data ...</li> <li>• ... that is currently being processed // that will be / has been processed</li> <li>• Data can travel in both directions (bidirectional)</li> </ul> <p><b>Control (bus)</b>  <b>Two</b> from:</p> <ul style="list-style-type: none"> <li>• Carries / transports signals</li> <li>• Control / directs the actions of the CPU / processor</li> <li>• Can be either Unidirectional or Bidirectional</li> </ul>	<b>6</b>

Question	Answer	Marks
<p>7</p>	<p>1 mark for correct line till 5 marks given.</p>	<p>5</p>

Question	Answer	Marks
<p>8</p>	<ul style="list-style-type: none"> <li>• Secondary</li> <li>• HDD/SSD</li> <li>• SSD/HDD</li> <li>• Primary</li> <li>• ROM/RAM</li> <li>• RAM/ROM</li> </ul>	<p>6</p>

Question	Answer	Marks
9	<p>1 mark for appropriate device name and 1 further mark for appropriate purpose.</p> <p><b>Input devices</b>  <b>Two</b> from:</p> <ul style="list-style-type: none"> <li>• <b>Keypad / Keyboard</b> ...</li> <li>• ... e.g. to allow customer to input the quantity of an item</li> <li>• <b>Touchscreen</b> ...</li> <li>• ... e.g. to allow a customer to select a payment method</li> <li>• <b>Barcode scanner / Barcode reader</b> ...</li> <li>• ... e.g. to allow a customer to scan in their shopping</li> <li>• <b>Card reader // Cash deposit / intake</b> ...</li> <li>• ... e.g. to allow a customer to pay for their shopping</li> <li>• <b>Weighing scales</b> ...</li> <li>• ... e.g. to allow a customer to weigh fresh produce</li> </ul> <p><b>Output devices</b>  <b>One</b> from:</p> <ul style="list-style-type: none"> <li>• <b>Display / Touchscreen</b> ...</li> <li>• ... e.g. to allow a customer to see the running total of their shopping</li> <li>• <b>Speaker</b> ...</li> <li>• ... e.g. to give audio instructions to a customer about how to use the self-checkout</li> <li>• <b>Printer</b> ...</li> <li>• ... e.g. to print a receipt for the customer</li> </ul>	6

Question	Answer	Marks															
10(a)	<p>1 mark for four correct outputs only</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</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>0</td> </tr> </tbody> </table>	A	B	Output	0	0	1	0	1	0	1	0	0	1	1	0	1
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10(b)	<p>1 mark for each correct section of the statement</p> <ul style="list-style-type: none"> <li>• (A AND B)</li> <li>• AND</li> <li>• (C OR NOT B)</li> </ul>	3															

Question	Answer	Marks
11	<p><b>Three</b> from e.g. :</p> <ul style="list-style-type: none"> <li>• (Provides an) interface</li> <li>• Loads / opens / installs / closes software</li> <li>• Manages the hardware // manages peripherals // spooling</li> <li>• Manages the transfer of programs into and out of memory</li> <li>• Divides processing time // processor management</li> <li>• Manages file handling</li> <li>• Manages error handling // manages interrupts</li> <li>• Manages security software</li> <li>• Manages utility software</li> <li>• Manages user accounts</li> <li>• Multitasking</li> <li>• Multiprogramming // time slicing</li> <li>• Batch processing</li> </ul>	<b>3</b>

Question	Answer	Marks
12(a)	<p>1 mark for appropriate sensor and 1 further mark for appropriate use.</p> <p><b>Two</b> from:</p> <ul style="list-style-type: none"> <li>• <b>Gas (sensor)</b> ...</li> <li>• ... e.g. to measure the levels of oxygen/carbon dioxide / nitrogen in the factory to make sure they are not too high / low</li> <li>• <b>Temperature (sensor)</b> ...</li> <li>• ... e.g. to measure the temperature of the chemicals to make sure it is not too high/low</li> <li>• <b>Motion / Infra-red (sensor)</b> ...</li> <li>• ... e.g. to detect any persons in an unauthorised area of the factory</li> <li>• <b>Pressure (sensor)</b> ...</li> <li>• ... e.g. to measure the pressure of chemicals flowing through pipes to check that level are not too high / low</li> <li>• <b>pH (sensor)</b> ...</li> <li>• ... to measure the pH to make sure the acidity / alkalinity of the chemicals is correct</li> <li>• <b>Light (sensor)</b> ...</li> <li>• ... to measure the level of light to make sure it remains at a constant level for the chemical process</li> </ul>	<b>4</b>
12(b)	<p><b>Five</b> from:</p> <ul style="list-style-type: none"> <li>• Sensors send signals to microprocessor</li> <li>• Analogue signals are <u>converted to digital</u> (using ADC)</li> <li>• Microprocessor compares value to stored value ...</li> <li>• ... If out of range / matches stored values ...</li> <li>• ... signal sent to alert workers (e.g. sound alarm)</li> <li>• ... microprocessor send signal to cause an action to occur e.g. cool a process down, heat a process up, add a chemical</li> <li>• ... no action taken</li> <li>• Output/record readings</li> <li>• Monitoring is continuous</li> </ul>	<b>5</b>

Question	Answer	Marks
13(a)	<b>Two</b> from: <ul style="list-style-type: none"><li>• Smaller file to transmit</li><li>• The file is transmitted quicker</li><li>• Uses / requires less bandwidth</li></ul>	<b>2</b>
13(b)(i)	<ul style="list-style-type: none"><li>• Lossless (compression) ...</li><li>• ... It is important the code must be (exactly) the same as the original file</li><li>• ... If it does not match the original file it will not work</li></ul>	<b>3</b>
13(b)(ii)	<ul style="list-style-type: none"><li>• Lossy (compression) ...</li><li>• ... It would make the file smaller than lossless compression / the file would stream faster than lossless compression</li><li>• ... The quality of the video can be reduced but it can still be viewed</li></ul>	<b>3</b>