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**COMPUTER SCIENCE**

**9608/22**

Paper 2 Written Paper

**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)	<table border="1"> <thead> <tr> <th>Item</th> <th>Statement</th> <th>Input</th> <th>Process</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>SomeChars = "Hello World"</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>2</td> <td>OUTPUT RIGHT(String1,5)</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3</td> <td>READFILE (MyFile, String2)</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>WRITEFILE (MyFile, "Data is " &amp; String2)</td> <td></td> <td>✓</td> <td>✓</td> </tr> </tbody> </table> <p>Mark as follows:</p> <p>Row 1 as shown</p> <p>Row 2 no marks if tick in Input column, otherwise 1 mark per tick</p> <p>Row 3 as shown</p> <p>Row 4 no marks if tick in Input column, otherwise 1 mark per tick</p>					Item	Statement	Input	Process	Output	1	SomeChars = "Hello World"		✓		2	OUTPUT RIGHT(String1,5)		✓	✓	3	READFILE (MyFile, String2)	✓			4	WRITEFILE (MyFile, "Data is " & String2)		✓	✓	6
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1(b)(i)	<ul style="list-style-type: none"> <li>• Integer / Real / Single / Double / Floating Point / Float</li> <li>• Boolean</li> </ul>					2																									
1(b)(ii)	<table border="1"> <thead> <tr> <th>Expression</th> <th>Evaluates to</th> </tr> </thead> <tbody> <tr> <td>(FlagA AND FlagB) OR FlagC</td> <td>TRUE</td> </tr> <tr> <td>FlagA AND (FlagB OR FlagC)</td> <td>TRUE</td> </tr> <tr> <td>(NOT FlagA) OR (NOT FlagC)</td> <td>FALSE</td> </tr> </tbody> </table> <p>1 mark per answer</p>					Expression	Evaluates to	(FlagA AND FlagB) OR FlagC	TRUE	FlagA AND (FlagB OR FlagC)	TRUE	(NOT FlagA) OR (NOT FlagC)	FALSE	3																	
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1(c)	<p>MyCount ← 101</p> <p>REPEAT   OUTPUT MyCount   MyCount ← MyCount + 2 UNTIL MyCount &gt; 199</p> <p>1 mark for each of the following:</p> <ul style="list-style-type: none"> <li>• Counter initialisation</li> <li>• Repeat ... Until loop</li> <li>• Method for choosing (correct range of) odd numbers</li> <li>• Output all odd numbers in the range</li> </ul> <p>Note: Counter variable name must be consistent</p>					4																									



Question	Answer	Marks
3	<pre> FUNCTION ExCamel (<u>InString</u>: STRING) RETURNS <u>STRING</u>   DECLARE <u>NextChar</u> : CHAR   DECLARE <u>OutString</u> : STRING   DECLARE n : INTEGER    <u>OutString</u> ← "" // initialise the return string   // loop through InString to produce OutString   FOR n ← 1 TO <u>LENGTH(InString)</u> // from first to last     <u>NextChar</u> ← <u>MID(InString, n, 1)</u> // get next character     IF <u>NextChar &gt;= 'A' AND NextChar &lt;= 'Z'</u> // check if upper   case       // <u>NextChar = UCASE(NextChar)</u>       THEN         IF n &gt; 1 // if not first character           THEN             <u>OutString</u> ← <u>OutString &amp; " "</u> // add space   to OutString           ENDIF         <u>NextChar</u> ← <u>LCASE(NextChar)</u> // make NextChar lower   case       ENDIF     <u>OutString</u> ← <u>OutString &amp; NextChar</u> // add Nextchar to   OutString   ENDFOR   <u>RETURN OutString</u> // return value ENDFUNCTION </pre> <p>1 mark per underlined word / expression</p>	Max 11

Question	Answer	Marks									
4(a)	<ul style="list-style-type: none"> <li>• Functions</li> <li>• Procedures</li> <li>• Global / Local variables</li> </ul> <p>1 mark per item</p>	<b>Max 2</b>									
4(b)	<table border="1"> <thead> <tr> <th>Name of parameter passing method</th> <th>Value output</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>(Call) by reference</td> <td>5</td> <td> <ul style="list-style-type: none"> <li>• The <u>address of the variable</u> is passed.</li> <li>• <u>Original value is changed</u> when parameter changed in called module.</li> </ul> </td> </tr> <tr> <td>(Call) by value</td> <td>4</td> <td> <ul style="list-style-type: none"> <li>• A <u>copy of the variable</u> itself is passed.</li> <li>• <u>Original value not changed</u> when parameter changed in called module.</li> </ul> </td> </tr> </tbody> </table> <p>Mark as follows:</p> <ul style="list-style-type: none"> <li>• 1 mark for each name <b>and</b> value</li> <li>• 1 mark per bullet in explanation</li> </ul>	Name of parameter passing method	Value output	Explanation	(Call) by reference	5	<ul style="list-style-type: none"> <li>• The <u>address of the variable</u> is passed.</li> <li>• <u>Original value is changed</u> when parameter changed in called module.</li> </ul>	(Call) by value	4	<ul style="list-style-type: none"> <li>• A <u>copy of the variable</u> itself is passed.</li> <li>• <u>Original value not changed</u> when parameter changed in called module.</li> </ul>	<b>6</b>
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Question	Answer	Marks
5(a)(i)	<ul style="list-style-type: none"> <li>• Any character <u>except</u> colon, space or any alpha-numeric</li> <li>• Reason: character is not in the login information strings</li> </ul>	<b>2</b>
5(a)(ii)	<p>DECLARE <u>LogArray</u> : ARRAY[1 : 20] OF <u>STRING</u></p> <p>1 mark per underline</p>	<b>2</b>

Question	Answer	Marks
5(b)	<p>Pseudocode solution included here for development and clarification of mark scheme. Programming language example solutions appear in the <b>Appendix</b>.</p> <pre> PROCEDURE LogEvents()   DECLARE FileData : STRING   DECLARE ArrayIndex : INTEGER   OPENFILE "LoginFile.txt" FOR APPEND   FOR ArrayIndex ← 1 TO 20 //     IF LogArray[ArrayIndex] &lt;&gt; "****"       THEN         FileData ← LogArray[ArrayIndex]         WRITEFILE ("LoginFile.txt", FileData)       ENDIF     ENDFOR   CLOSEFILE ("LoginFile.txt") ENDPROCEDURE </pre> <p>1 mark for each of the following:</p> <ol style="list-style-type: none"> <li>1. Procedure heading and ending</li> <li>2. Declare <code>ArrayIndex</code> as integer // commented in python</li> <li>3. Open file 'LoginFile' for append</li> <li>4. Correct loop</li> <li>5. extract data from array <b>in a loop</b></li> <li>6. check for unused element <b>in a loop</b></li> <li>7. write data to file <b>in a loop</b></li> <li>8. Close the file <b>outside the loop</b></li> </ol>	8

Question	Answer	Marks
6(a)	<p>Pseudocode solution included here for development and clarification of mark scheme. Programming language example solutions appear in the Appendix.</p> <pre> FUNCTION ValidateRegistration(Registration : STRING) RETURNS                                 BOOLEAN     DECLARE UCaseChar, NumChar : INTEGER     DECLARE NextChar : CHAR     DECLARE ReturnFlag : BOOLEAN     DECLARE n : INTEGER      ReturnFlag ← TRUE     ValidateRegistration ← True      IF LEN(Registration) &lt; 6 OR LEN(Registration) &gt; 9 //check   length     THEN         ReturnFlag ← False     ELSE         FOR n ← 1 TO 3 //check for 3 upper case alpha             NextChar ← MID(Registration, n, 1)             IF NextChar &lt; 'A' AND NextChar &gt; 'Z'             THEN                 ReturnFlag ← False             ENDIF         ENDFOR          FOR n ← 4 TO 5 //check for 2 numeric             NextChar ← MID(Registration, n, 1)             IF NextChar &lt; '0' AND NextChar &gt; '9'             THEN                 ReturnFlag ← False             ENDIF         ENDFOR          FOR n ← 6 TO LEN(Registration) //check remaining   characters             NextChar ← MID(Registration, n, 1)             IF NextChar &lt; 'A' AND NextChar &gt; 'Z'             THEN                 ReturnFlag ← False             ENDIF         ENDFOR     ENDIF     RETURN (ReturnFlag) ENDFUNCTION </pre>	Max 9

Question	Answer	Marks
6(a)	<p>1 mark for each of the following:</p> <ol style="list-style-type: none"> <li>1. Correct Function heading and ending</li> <li>2. Check for correct length</li> <li>3. Extract first three characters</li> <li>4. Check first three characters are capitals</li> <li>5. Extract characters four and five</li> <li>6. Check characters four and five are numeric</li> <li>7. Extract remaining characters</li> <li>8. Check remaining characters are capitals</li> <li>9. Combine all four tests results into a single Boolean value</li> <li>10. Return a Boolean value</li> </ol>	
6(b)	<p><b>String1:</b> (for example, "ABC12XYZ")</p> <p>One mark for a valid string having:</p> <ul style="list-style-type: none"> <li>• Correct length (between 6 and 9 characters)</li> <li>• 3 capital letters followed by...</li> <li>• 2 numeric characters followed by...</li> <li>• between 1 and 4 capital letters</li> </ul> <p><b>String2 to String5:</b></p> <p>1 mark for each string <b>and</b> explanation (testing different rules of the function)</p> <p>Test strings breaking <b>one different</b> rules:</p> <ul style="list-style-type: none"> <li>• Incorrect length</li> <li>• With incorrect number of capital letters at the start</li> <li>• With non-numeric characters in positions 4 and 5</li> <li>• With incorrect number of capital letters at the end</li> <li>• Containing an invalid character (not alpha-numeric)</li> </ul>	<b>5</b>