

5(a)(i)	1 mark per bullet point, max 2 marks • Installs <u>driver</u> software for devices connected to external ports • Manages communication between devices • Manages <u>hardware</u> interrupts
5(a)(ii)	1 mark per bullet point, max 2 marks • Prevents unauthorised access • ... by providing authentication // by validating users and processes • Implements access rights and permissions • Makes provision for recovery of lost data • Carries out Operating System security updates as available • Carries out auditing and keeps logs of activity
5(b)(i)	One mark for benefit, one mark for appropriate matching expansion e.g. • Less code needs to be developed as code is pre-written • ... thereby reducing the time to write a program • The library routine will be pre-tested and documented • ... reducing the time taken to test a program // giving confidence that the routine works as it should • The code for the library routine can be written in a different programming language • ... which allows the use of special features of that language • The user's source code is more readable • ... as the library routine is simply called in the source code rather than being written out in full • The library could contain the code for complex routines • ... thus allowing the programmer to include modules they might not be able to code
5(b)(ii)	1 mark for drawback, 1 mark for appropriate matching expansion e.g. • Compatibility issues • ... the library routine may not work with current program • Not guaranteed to be thoroughly tested • ... there could be unexpected problems (bugs/virus) • The library routine may not match needs exactly // The library routine may give unexpected results • ... so it will need to be edited and tested • If the library routine is later edited or changed (by someone else) • ... there could be unexpected errors or results
5(c)	1 mark per bullet point, max 2 marks • Prettyprint • Expanding and collapsing code blocks • <u>Automatic</u> / <u>smart</u> indentation / formatting

8(a)(i)	1 mark per bullet point, max 2 marks • Cloud storage can be free of charge for a limited amount • There is no need for personal storage devices • The data can be accessed from any computer with an internet connection • Cloud data services usually include data backup and recovery services • It is easier to share data / collaborate with colleagues • Cloud storage capacity can be quickly and easily increased if needed
8(a)(ii)	1 mark per bullet point, max 2 marks • The storage/cloud can only be accessed with an internet connection • There may be no backups // possibly no control over backups // reliance on third party for backups • Uploading / downloading data could take a long time • Potential issues with the cloud storage company impacting access e.g. downtime or technical problems • Potential compatibility issues if wanting to move the data • Limited storage availability without paying extra • ... meaning (possibly) more expensive in the long term • Possibly security issues
8(b)(i)	1 mark per bullet point, max 4 marks Methods to determine point of touch (Max 2) • Resistive // two layers of material make contact and complete a circuit • Capacitive // contact with the screen creates a change in charge • Infrared // the beams are broken by the pointing device • Optical imaging // a shadow is created when the surface is touched • Acoustic pulse // the acoustic wave is absorbed by the pointing device • Selection from the menu (Max 2) • The point of touch is used to determine the x and y coordinates • The menu item corresponding to the coordinate position is recognised and the menu item is added to the order
8(b)(ii)	1 mark per bullet point, max 2 marks • Disk repair / disk contents analysis • Back-up software

10(a)	1 mark per bullet point, max 4 marks Max 2 from each section. Interpreter: • Use an interpreter while writing/coding the program • ... to test / debug the partially completed program • ... because errors can be corrected and processing continue from where the execution stopped // errors can be corrected in real time // errors are identified one at a time Compiler: • Use the compiler after the program is complete • ... to create an executable file so source code not seen • Use the compiler to repeatedly test the same completed section without having to re-interpret every time
10(b)	1 mark per bullet point, max 2 • The software is free of restrictions • The software is not necessarily free of charge • The <u>source code</u> comes with the program // A user can edit the <u>source code</u> to add functionality / suit their needs • Users can share the software with others
10(c)	1 mark for a correct answer • Digital Signature

1(a)	<table><tr><th colspan="2">Expression</th></tr><tr><td colspan="2">MyString ← 'X' & MyString</td></tr><tr><td colspan="2">MyChar ← MID ("ABCD", 1 / 2 / 3 / 4 , 1)</td></tr><tr><td colspan="2">MyString ← NUM_TO_STR (DAY / MONTH / YEAR / DAYINDEX (MyDOB))</td></tr><tr><td colspan="2">MyInt ← INT (LENGTH (MyString) / 2)</td></tr></table> One mark per row	Expression		MyString ← 'X' & MyString		MyChar ← MID ("ABCD", 1 / 2 / 3 / 4 , 1)		MyString ← NUM_TO_STR (DAY / MONTH / YEAR / DAYINDEX (MyDOB))		MyInt ← INT (LENGTH (MyString) / 2)	
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1(b)	<table><tr><th>Test description</th><th>Test method</th></tr><tr><td>carried out as soon as a program module has been coded</td><td>alpha</td></tr><tr><td>carried out as program modules are being combined</td><td>integration</td></tr><tr><td>completed by the developers without referring to the code</td><td>black-box</td></tr><tr><td>completed by the customer</td><td>acceptance / beta</td></tr></table> One mark per row (2 to 4)	Test description	Test method	carried out as soon as a program module has been coded	alpha	carried out as program modules are being combined	integration	completed by the developers without referring to the code	black-box	completed by the customer	acceptance / beta
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1(c)	One mark per point: 1 reference to a breakpoint 2 reference to single stepping 3 Correct explanation of both e.g. to stop program execution at specific point / line / statement / instruction and to execute one line / statement / instruction at a time to (locate an/the error) One mark for each bulleted point										