

Computing (Pilot)

General Certificate of Secondary Education

Unit **A451**: Computer systems and programming

Mark Scheme for June 2011

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Question		Expected Answer	Mark	Rationale/Additional Guidance
1	(a)	<ul style="list-style-type: none"> • Storage: device used to store data (in binary format for processing later) • Input: device used to enter data into the computer • Output: device used to present information/the result of processing to the user 	[3]	
	(b)	Handheld device <ul style="list-style-type: none"> • Solid state • Quick access (for instant on)/not sensitive to being moved around while used Main file server <ul style="list-style-type: none"> • Magnetic • Very Large capacity/relatively cheap School production <ul style="list-style-type: none"> • Optical • Cheap/Portable/Universally readable by a most computers and dedicated video disc players 	[6]	Mark second column only if second row is correct


(c)	<p>High Level Response (5/6): A good understanding with detailed descriptions of a range of relevant input as well as output devices; The information will be presented in a structured and coherent form. There will be few if any errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly.</p> <p>Medium Level Response (3/4); awareness of relevant input and output devices with either a range with descriptions although these may be weak for some devices; The information will be presented in a structured format. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct.</p> <p>Low level response (0/2): Some relevant devices may be listed with few if any descriptions; Information will be poorly expressed and there will be a limited, if any, use of technical terms. Errors of grammar, punctuation and spelling may be intrusive.</p> <p>Points may include: Input devices:</p> <ul style="list-style-type: none"> • Puff-suck switch: allows mobility impaired users to control eg clicking a mouse, by sucking or blowing through a tube • Simplified/concept keyboards eg for Braille, or larger keys • Eye tracking input – Camera is used to follow the users eye movements and use these to control eg movement of mouse on screen. <p>Output device:</p> <ul style="list-style-type: none"> • Braille printer – print documents on paper in braille as raised bumps. Some brailers have plastic bumps which can be raised or lowered by software, so output does not have to be on paper. • Text to speech • Screen magnifiers 	[6]	
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Question		Expected Answer	Mark	Rationale/Additional Guidance
2	(a)	<ul style="list-style-type: none"> • A Database Management System/Used to manage the database • May use SQL/allows database to be queried • Provides facilities for creating tables/inserting data/viewing data/reporting • Allows data structure to be independent of the program • Allows relationships to be created between tables/Maintains integrity • Provides security features/levels of access 	[3]	Accept other relevant points.
	(b)	<p>Form:</p> <ul style="list-style-type: none"> • An <u>input</u> screen • Allowing chosen data items to be displayed and edited • Uses texboxes/drop down lists/checkboxes etc... • When edited, the changes are updated in the database • Suitable example from shop eg enter new products <p>Report:</p> <ul style="list-style-type: none"> • An <u>output</u> of the data in a database • A snapshot of the data at a given time/when printed • Of specified fields/Laid out in a specified format • Aggregates may be calculated and displayed • Suitable example from shop eg weekly sales <p>Up to 2 marks for description and 1 mark for example</p>	[6]	

	(c)	(i)	<p>Supplier = Killey's. Answer: 0003, 0006</p> <ul style="list-style-type: none"> • award 1 mark if both answers present and no others <p>Price > £1.00 OR Supplier = Hill Farm Answer: 0001, 0002, 0004, 0008</p> <ul style="list-style-type: none"> • Award 1 mark if 0001, 0002, 0004 are all in answer • Award 1 mark if 0002 and 0008 are in answer • Award 1 mark if 0002 is not repeated and there are no extra answers 	[4]	Accept eg 3, 6 or product names, or any other response where the records selected is clear.
			<ul style="list-style-type: none"> • Discontinued = False • AND • Quantity Left < Reorder Level 	[3]	Accept algebraically equivalent forms

Question			Expected Answer	Mark	Rationale/Additional Guidance												
3	(a)	(i)	<ul style="list-style-type: none"> • HyperText Mark-up Language • Text file containing the text to be displayed... • ... uses tags which indicate how to display it • ... location of pictures/other elements to include • ... and hyperlinks to other locations/URLS 	[2]	Accept other valid answers												
		(ii)	<ul style="list-style-type: none"> • Web browser used to interpret the file and display the data correctly • Because it is an open/accepted standard... • ... data will display correctly on all browsers • ... which conform to the standard 	[2]													
	(b)		<table border="1"> <thead> <tr> <th>File</th> <th>File Format</th> </tr> </thead> <tbody> <tr> <td>A high resolution image of the band to use as your desktop background.</td> <td>JPG</td> </tr> <tr> <td>Sheet music of their songs ready to be printed in the correct format for guitar players.</td> <td>PDF</td> </tr> <tr> <td>A short video extract from their latest concert tour.</td> <td>MPEG</td> </tr> <tr> <td>A compressed collection of 200 plain text files containing the lyrics of all their songs.</td> <td>ZIP</td> </tr> <tr> <td>An audio recording of a song from their future album.</td> <td>MP3</td> </tr> </tbody> </table> <p>(1 mark per row)</p>	File	File Format	A high resolution image of the band to use as your desktop background.	JPG	Sheet music of their songs ready to be printed in the correct format for guitar players.	PDF	A short video extract from their latest concert tour.	MPEG	A compressed collection of 200 plain text files containing the lyrics of all their songs.	ZIP	An audio recording of a song from their future album.	MP3	[5]	
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	(c)	(i)	<ul style="list-style-type: none"> • It reduces the size of the file which needs to be transmitted • Shortens download time • Reduces Internet traffic (and hence probability of lost packets) • Allows multimedia files to be streamed 	[2]	
		(ii)	<ul style="list-style-type: none"> • In lossy compression, when the data is uncompressed it is not exactly the same as the original • But the difference is so small that it cannot normally be noticed • Eg music files(mp3), large resolution images for displaying on small screens. • In lossless compression, when the data is uncompressed it is restored completely to the original file • Eg compressed text files. <p>(1 mark per bullet, but maximum of 3 if no examples given).</p>	[4]	Accept any valid examples

Question			Expected Answer	Mark	Rationale/Additional Guidance															
4	(a)	(i)	<table border="1"> <tr> <td>A</td> <td>B</td> <td>P</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </table> <p>1 mark per correct row</p>	A	B	P	0	0	0	0	1	1	1	0	0	1	1	0	[3]	
A	B	P																		
0	0	0																		
0	1	1																		
1	0	0																		
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		(ii)	 <ul style="list-style-type: none"> • A B input into an AND gate • Result from AND gate put through a NOT gate (to give P) 	[2]	Accept use of NAND gate for 2 marks Award 1 mark for diagram of (NOT A) AND (NOT B)															
5	a		<p>Antivirus</p> <ul style="list-style-type: none"> • Scans the computer <u>periodically</u> • To check if any software has been installed which contains code that may harm the computer • Removes/quarantines these programs / notifies the user • Prevents these programs from being installed • Protects the computer by preventing important files (eg the boot sector or operating system) from being changed 	[2]																
	b		<p>Disk defragmenter</p> <ul style="list-style-type: none"> • Moves (parts of) of files around so that all parts of a file are stored together (allowing files to be accessed more quickly) • Free space is collected together (allowing large files to be saved easily) 	[2]																

Question		Expected Answer	Mark	Rationale/Additional Guidance
6	(a)	<ul style="list-style-type: none"> $6 * 16 (= 96) / 10$ (for A) 106 	[2]	
	(b)	0110 1010 (1 mark per nibble)	[2]	
	(c)	3D (1 mark per digit)	[2]	Award 1 mark if candidate makes a sensible attempt to convert to denary and then hex but makes an arithmetic error in the process.
	(d)	<ul style="list-style-type: none"> Hex numbers are shorter/more memorable than equivalent binary numbers.. ... and can easily be converted to and from binary... ... as each hex digit corresponds to 4 binary digits (accept diagram) 	[2]	Do not accept "uses less memory" and similar as being the same as "shorter"
7	(a)	(i) <ul style="list-style-type: none"> Constant: Pi Variables: WheelSize, Circumference 	[2]	
		(ii) <ul style="list-style-type: none"> The value of a constant is set when the constant is declared The value of a variable is set while the program is running The value of a constant cannot be changed once the program is running/can only be set at design time A variable has no value at design time <p>Marks in pairs</p> <ul style="list-style-type: none"> An integer is a whole number A real number can include decimal fractions 	[2] [2]	

Question	Expected Answer	Mark	Rationale/Additional Guidance
8	<p>High Level Response (5/6): A good understanding with detailed descriptions of the measures and policies, explaining how they help privacy and security; The information will be presented in a structured and coherent form. There will be few, if any, errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly.</p> <p>Medium Level Response (3/4); some appropriate measures and policies with weak descriptions; The information will be presented in a structured format. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct.</p> <p>Low level response (0/2): There may be some measures and policies mentioned but descriptions are incomplete or may contain inaccuracies; Information will be poorly expressed and there will be a limited, if any, use of technical terms. Errors of grammar, punctuation and spelling may be intrusive.</p> <p>Points may include:</p> <ul style="list-style-type: none"> • Physical security measures – computers/servers in locked rooms, lock down cables for laptops • Firewalls – allow only authorised access to the network / only authorised users/programs to share data out of the network • User groups/access levels – different users are given rights to different data according their responsibility/need to protect privacy • Passwords enforced. Should be strong and changed regularly. Ensures privacy and protects files being accessed by malicious hackers • Encryption of data on network • WiFi access security if they use WiFi • Get employees to sign an acceptable use policy as part of their contract to ensure they do not put the 		

Question	Expected Answer	Mark	Rationale/Additional Guidance
	data at risk of corruption/abide by data protection legislation/do not give the data to third parties etc.	[6]	
9	<p>Example:</p> <pre> BEGIN Input RealAge IF RealAge <= 2 DogYears = RealAge * 12 ELSE ExtraYears = RealAge - 2 DogYears = 24 + ExtraYears * 6 END IF END </pre> <p>Award marks for an algorithm which:</p> <ul style="list-style-type: none"> • Allows real age to be input • If age <=2, multiply real age by 12 <p>If age >2</p> <ul style="list-style-type: none"> • Works out extra years (real age – 2) ... • ... multiply by 6 • ... adds 24 (for the first 2 years) 	[5]	
	Total	[80]	

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