OCR
RECOGNISING ACHIEVEMENT

GCSE

Computing

General Certificate of Secondary Education

Unit **A451:** Computer systems and programming

Mark Scheme for June 2012

Oxford Cambridge and RSA Examinations

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotation	Meaning
^	Omission mark
BOD	Benefit of doubt
C	Subordinate clause/Consequential error
Cross	Cross
E	Expansion of a point
FT	Follow through
NAQ	Not answered question
NBOD	Benefit of doubt not given
P	Point being made
REP	Repeat
/	Slash
Tick	Tick
TV	Too vague
ZERO	Zero (big)

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><td></td><td>is an output device</td><td>is not an output device</td></tr>
<tr><td>Screen</td><td>✓</td><td></td></tr>
<tr><td>USB Port</td><td></td><td>✓</td></tr>
<tr><td>Speaker</td><td>✓</td><td></td></tr>
</table>
(1 mark per row)
</td><td>3</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>e.g
• Touch screen
• … respond to fingers / stylus on specified icons
• … for example a software keyboard
• … eg converts handwriting to text

• Hardware buttons
• … a small number around the edge of the tablet
• … for most common commands
• … eg bring up menu / next / previous / play / pause etc…

• Microphone
• … captures user’s speech and analyses it to match known patterns for commands
• … or speech recognition for typing documents
• … can be made to learn new commands / macros

• Camera
• ... used to capture user’s image / for webcam applications
• ... used to capture user’s movement eg as input to games
• ... used to capture text for processing by OCR</td><td>4</td><td>Not Keyboard or onscreen keyboard
Not mouse (but accept an in-built pointer device e.g. touchpad)</td></tr>
</table>

Question			Answer	Marks	Guidance
			• Accelerometer / tilt sensor • ... used to determine the position in which the tablet is held • ...to change screen orientation automatically (eg movie image) • ... used as in input to games (1 mark for identifying device and 1 mark for use)		
2	(a)		• Bus	1	
	(b)		• Router / Modem / ADSL adapter	1	
	(c)		e.g. • Controls access to the network / verify passwords entered on any computer • Provides files to the other computers on the network • Installs software on workstations • Make the printer accessible to the other computers • Controls the access of computers to the Internet/to each other • Stores, delivers and sends emails for all users on the network	3	Accept short descriptions eg domain controller, file server etc. Do not accept simply "manages or monitors or controls printer/Internet/devices…". The candidate should clearly be referring to users/workstations accessing these.
	(d)		• All computers have equal status/no server controlling • To share data/files/devices between each other	2	
3			1 1 1 1	4	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4</td><td></td><td></td><td>
<table>
<tr><td></td><td>image file</td><td>sound file</td><td>video file</td></tr>
<tr><td>AVI</td><td></td><td></td><td>✓</td></tr>
<tr><td>BMP</td><td>✓</td><td></td><td></td></tr>
<tr><td>JPG</td><td>✓</td><td></td><td></td></tr>
<tr><td>MP3</td><td></td><td>✓</td><td></td></tr>
</table>
(one mark per row)
</td><td>4</td><td></td></tr>
<tr><td>5</td><td></td><td></td><td>System cleanup
• (Searches for and) deletes files/programs which are no longer used
• … eg deletes temporary files / installation files
• … deletes settings / registry values which are no longer used

Automatic update
• Checks on the (software manufacturer's site on the) Internet for newer versions of programs which are installed
• If found it download / installs the software</td><td>4</td><td></td></tr>
<tr><td>6</td><td>(a)</td><td></td><td>0011 0111
(1 mark per nibble)</td><td>2</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>37
(1 mark per digit)</td><td>2</td><td>Allow ft from (a)</td></tr>
</table>

Question			Answer	Marks	Guidance
7	(a)		• Fetches instructions (from memory) • Fetches data (from memory) • Decodes instructions • Executes instructions	2	
	(b)		Clock Speed: • The higher the clock speed the faster the CPU will run • Represents the number of fetch execute cycles / instructions the CPU can process in a given time Cache size • the more cache the CPU has the less time is spent accessing memory / programs run faster… • cache is faster than memory/ built into the CPU/contains frequently accessed data (max 2 each)	4	
8	(a)		• Username: 2012johnsonm • year 2012, surname: Johnson, initial m • As there are no other johnsons (so the answer to the decision will be NO)	3	Username must be spelt correctly, but accept 12johnsonm
	(b)		• The pupil joined in 2010 • The pupil's surname is Ali • The pupil's initial is M • There were (at least) 3 other pupils called M. Ali in the same year	4	
9	(a)		• Database management system	1	

Question			Answer	Marks	Guidance	
					Content	Levels of response
	(b)		Points may include: Features • Provides a set of tools for accessing/maintaining the database, eg to define/create tables, run queries or define reports • The application is independent from the data base itself • Provides data integrity control (eg integrity checks, validation checks) • Controls access to data, including security and multiple user access Why desirable • These can be set up before hand by expert and used by end user • Separating application and database means the database can be accessed separately by other means eg a desktop application and web application accessing the same data / other suitable example Data is protected from corruption eg by multiple access	6		**High Level Response (5-6)** A good understanding with detailed descriptions of the role of both the features of a DBMS and an explanation of its desirability. There will be few if any errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly. **Medium Level Response (3-4)** A description of the features of a DBMS and an explanation of its desirability, but one may be limited. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. **Low Level Response (0-2)** There may be an attempt to describe the features of a DBMS and/or its benefits but this is vague and some of the statements made are inaccurate. 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.

Question			Answer	Marks	Guidance
10	(a)		• So that computers can be based on logic circuits. • … (each part of the circuit) can be in one of two states • ... 0 and 1/true or false	2	Mention of 0/1 without the right context is too vague for a mark.
	(b)		• The instruction consists of an operator/op code • ... and an operand • both stored as bit patterns • (op code) from a given instruction set • Each op code has a unique bit pattern	3	
11	(a)		eg • In high level code Instructions use words • In machine code instructions are in binary code • High-level code is designed to be read by human programmers • Machine code is to be read/executed by the computer • High level code can be portable/translated <u>for different machines</u> • Machine code is specific to a particular machine (marks in pairs)	4	Do not accept high level needs to be translated (as this is in the question)
	(b)	(i)	• Translates one line of HL code at a time… • … and executes it • … stops when it finds an error • … can be resumed	2	
		(ii)	• Compiler	1	

Question			Answer	Marks	Guidance	
					Content	Levels of response
	(c)		Points may include: Programmers need to understand each other's code • … so need clear commenting / consistent formats eg for variable names • … suitable examples Programmers need to ensure that their code will work with the code written by others • … agree clear interfaces between modules • … and stick to agreed interfaces/ protocols • … suitable examples The success of one programmer's work depends on the others • … so a need for professionalism • … suitable examples	6		**High Level Response (5-6)** A detailed explanation why standards are needed with relevant examples. There will be few if any errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly. **Medium Level Response (3-4)** Some explanation of standards needed with examples but a limited explanation of why they are needed. Examples may not be wholly relevant. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. **Low Level Response (0-2)** There may be a vague description of standards but with no or little explanation of why needed and/or examples. 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.

Question			Answer	Marks	Guidance
12	(a)		Sequence Iteration Selection	3	
	(b)		A number which can contain a fractional part A whole number	2	Not rounded off…

	(c)		EXAMPLE:
			`INPUT Distance`
			`INPUT Passengers`
			`Extra = Distance – 1`
			`CostofExtra = Extra * 2`
			`Cost = 3 + CostofExtra`
			`IF Passengers > 4 THEN`
			`  Surcharge = Cost / 2`
			`  Cost = Cost + Surcharge`
			`END IF`
			`OUTPUT COST`
			
			Award marks for:
			• Inputs distance and passengers
			• Calculates distance – 1 (or equivalent)
			• Calculates previous answer * 2(or equivalent)
			• Calculates previous answer + 3
			• Checks if more than 4 passengers…
			• … and adds 50% correctly
			• Outputs cost
				7	Several very different algorithms possible, but any correct solution will address all stated bullet points.
					eg Cost = (Distance * 2) + 1
					Satisfies bullets 2, 3 and 4.
					
					Candidates do not need to have considered cases where the distance < 1.

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