

# **Computing**

Advanced Subsidiary GCE

Unit **F451**: Computer Fundamentals

## **Mark Scheme for January 2011**

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Question	Expected Answer	Mark	Additional Guidance
1 (a)	<ul style="list-style-type: none"> <li>• Hardware is physical parts of system</li> <li>• Software is instructions/code/programs</li> </ul>	[2]	Must distinguish between hw & sw Eg. "components" insufficient. Accept Tangible/touchable "Not physical" allowed for sw <b>not</b> just examples
(b)	<p><u>System software</u> Controls the hardware of the computers/gives a platform to run other software</p> <p><u>Applications software</u> Makes the hardware/allows the user to, do something useful/carries out a task (which would have had to be done without a computer).</p>	[1]  [1]	Controls operation of computer system/communications/setup instructions/allows the computer to run.
(c) (i)	Data could become corrupted/disk might crash/data could be lost.	[1]	Retrieval <u>from copy</u> .
(ii)	<ul style="list-style-type: none"> <li>• Take a <u>copy</u> of all the files</li> <li>• ...onto a removable <u>storage</u>/ solid state storage/ pen drive/ CDRW / DVDRW /online /tape /external or removable HDD</li> <li>• At a regular interval/eg weekly</li> <li>• Back up kept away from the computer/secure location</li> <li>• Mention of automatic/incremental backup</li> </ul> <p>[1 per point, max 3]</p>	[3]	<b>Not</b> USB or external device or DVD or DVDROM or CD or CDROM.

Question	Expected Answer	Mark	Additional Guidance
2 (a)	<ul style="list-style-type: none"> <li>• The two people involved will have very different ideas of the problem / Necessary that they solve problem which they agree on...</li> <li>• ...or manager will be unhappy/software will be useless...</li> <li>• ...analyst will not be paid.</li> </ul> (1 per point, max 2) <ul style="list-style-type: none"> <li>• Analyst is expert in use of computers</li> <li>• Manager is expert in area of problem</li> </ul> (1 per point, max 2)	[4]	
(b)	<ul style="list-style-type: none"> <li>• Method of implementation/mention of one or more of: parallel/pilot/phased/direct</li> <li>• Training program must be devised/materials written.</li> <li>• Files must be created/need to produce files/adapt or reformat present ones</li> <li>• Hardware must be bought/installed/commissioned</li> <li>• System must be tested/with real data files/by users</li> <li>• Post monitoring for errors/provide technical documentation</li> </ul> (2 per point, max 2 point, max 4)	[4]	<p><b><u>not analyst</u></b> training the staff</p> <p>Choose best two answers.</p>
(c)	<ul style="list-style-type: none"> <li>• (Simple version of program to) illustrate a feature of the software</li> <li>• Normally used to illustrate input and output screens</li> <li>• The screens are dummies in that they elicit no action</li> <li>• Used to show manager the way system will look/ allows issues to be spotted...</li> <li>• ...to allow <u>manager</u> to be part of the design process/to give feedback/evaluate</li> <li>• Used to research new ideas</li> <li>• Used to refine prototype</li> <li>• May include a story board showing linking of screens</li> </ul> (1 per point, max 4)	[4]	

Question	Expected Answer	Mark	Additional Guidance
3	Description that includes the following points: <ul style="list-style-type: none"> <li>• eg. Wired/cable/copper/coaxial/ Twisted Pair, description/ interference</li> <li>• Optical fibre/transmits data using light beams/interference free</li> <li>• Infrared/unobstructed line of sight/example</li> <li>• Microwave/used by business to connect network in different locations/line of sight necessary</li> <li>• Wireless/used over short distances/not secure because anyone can tap in</li> <li>• Bluetooth/wireless communication over very short distances</li> <li>• Serial, parallel / description</li> <li>• Duplex, half duplex / description</li> </ul> (2 per point, max 3 point, max 6)	[6]	One for naming, one for , description/ interference.

Question	Expected Answer	Mark	Additional Guidance
4 (a) (i)	699	[1]	
(ii)	<ul style="list-style-type: none"> <li>-187 (1 for -, 1 for 187)</li> </ul>	[2]	(Do not give mark for - if obviously twos complement)
(iii)	<ul style="list-style-type: none"> <li>Two types of data in same value / msb is a sign ...</li> <li>...must be treated differently</li> <li>Makes arithmetic algorithms very complex</li> <li>Extending from 1 byte to 2 or more bytes very difficult</li> </ul> (1 per point, max 3)	[3]	
(b) (i)	$\begin{array}{r} 11011000 \\ 1 \quad 11 \\ \hline \end{array}$ (1 for answer, 1 for carries)	[2]	
(ii)	$\begin{array}{r} 10110010 \\ 00100110 \\ \hline 10001100 \end{array}$ (1 for answer. 1 for showing method)	[2]	

Question	Expected Answer	Mark	Additional Guidance
5	<p><b>Mark band 6-8. Higher level response</b>  Candidate has discussed the effects on the confidentiality of data held on computers.  Positive and negative points have been made.  A number of measures have been given which can be taken to protect the confidentiality of the data. Candidate has linked the measures to the negative points affecting the confidentiality of the data.  The candidate has used appropriate technical terminology throughout.  There are no spelling errors or errors of grammar.</p> <p><b>Mark band 3-5. Medium level response</b>  Candidate has discussed the effects on the confidentiality of data from one viewpoint, probably negative.  A number of measures will have been given which can be taken to protect the confidentiality of the data.  The candidate has used some technical terminology in the response.  There may be spelling errors or grammatical errors but they are not obtrusive.</p> <p><b>Mark band 0-2. Low level response</b>  Candidate has stated some points about confidentiality of data or measures to be taken are limited.  The candidate has failed to use technical terminology in the response.  Spelling errors and grammatical errors are obtrusive.</p> <p>Points may include:  Positive points:</p> <ul style="list-style-type: none"> <li>• The data is not readable without access to a computer</li> <li>• The data is not stored in human readable form</li> <li>• Easier to log who has accessed the data</li> </ul> <p>Negative points:</p> <ul style="list-style-type: none"> <li>• The files of data can be easily and quickly copied</li> <li>• Copies of data can be placed on media or sent elsewhere electronically</li> <li>• Searches for specific data to steal can be made easily and quickly</li> <li>• Systems can be hacked and data looked at remotely</li> <li>• More difficult to restrict number of copies of data in circulation</li> </ul>		

Question	Expected Answer	Mark	Additional Guidance
	<p>Measures which can be taken:</p> <ul style="list-style-type: none"><li>• Passwords to gain access to system</li><li>• Passwords to access files</li><li>• Encryption of data</li><li>• Firewalls to restrict access to systems</li><li>• Physical measures to restrict access</li><li>• Proxy server to restrict users allowed access to individual machines on network from internet</li><li>• Intrusion detection system to warn when uninvited access is attempted</li></ul>	<b>[8]</b>	

Question	Expected Answer	Mark	Additional Guidance
6 (a)	<ul style="list-style-type: none"> <li>• LAN over short distances/WAN over geographically remote distances</li> <li>• LAN hardwired or short range wireless/WAN tends to use third party communication links</li> <li>• LAN more secure/WAN subject to attack</li> <li>• LAN requires no extra communication device/WAN requires modem</li> </ul> (1 per point, max 2)	[2]	
(b)	<ul style="list-style-type: none"> <li>• Data is transmitted</li> <li>• Received data is retransmitted back to sender</li> <li>• When received at source returned signal is compared to original...</li> <li>• ...if any differences the data is retransmitted (dependent on 3<sup>rd</sup> bullet).</li> </ul> (1 per point, max 3)	[3]	
(c)	<ul style="list-style-type: none"> <li>• PS has no established route/CS establishes a route for duration of message</li> <li>• PS means packets being sent on individual routes/CS sends packets all on same route</li> <li>• PS message cannot be intercepted/CS message can because all on same route</li> <li>• PS packets (arrive out of order and) <u>must be reordered</u>/CS packets remain in correct order/must be reassembled</li> <li>• PS maximises use of network/CS ties up large areas of network</li> </ul> (2 per point, max 3 point, max 6)	[6]	

Question	Expected Answer	Mark	Additional Guidance
7 (a) (i)	Eg <ul style="list-style-type: none"> <li>• Used to read printed documents</li> <li>• Can be used by blind people to read books/mail...</li> <li>• Data output can be turned into speech/enlarged for clearer effect.</li> </ul>	[2]	
(ii)	eg <ul style="list-style-type: none"> <li>• Microphone/instructions or data can be read into computer/useful for person without use of hands</li> <li>• Speakers/useful for visually impaired people instead of monitor/tells user what the computer has processed.</li> <li>• Puff-suck switch/used as digital input/by people who have lost use of limbs (accept other devices if explained) (2 per point, max 2 point, max 4)</li> </ul>	[4]	
(b) (i)	<ul style="list-style-type: none"> <li>• Store software/OS/data files</li> <li>• Large capacity/fast access to data</li> </ul>	[2]	
(ii)	<ul style="list-style-type: none"> <li>• Import of software/Encyclopaedias...</li> <li>• Cannot be written to/information cannot be changed (dependent on 1<sup>st</sup> bullet).</li> </ul>	[2]	
(iii)	<ul style="list-style-type: none"> <li>• Transport work to and from school/make back ups</li> <li>• Small/light/large capacity/portable/usable on any machine/robust (1 per point, max 6)</li> </ul>	[2]	

Question	Expected Answer	Mark	Additional Guidance
8 (a)	<ul style="list-style-type: none"> <li>• Process is unique/a one-off</li> <li>• Generic software will not exist (to do just this).</li> <li>• The generic control software will have many unused features/ bespoke written specifically for this purpose.</li> <li>• Custom-written can be written to allow ease of changes to production</li> </ul> (1 per point, max 2)	[2]	
(b) (i)	<ul style="list-style-type: none"> <li>• DTP used for producing brochures/leaflets/flyers...</li> <li>• Drawing package/to produce adverts/leaflets/flyers...</li> <li>• Graphics/to create images.</li> <li>• Digital editor/to edit sound/video for presentation.</li> <li>• Word Processor/to produce letters/emails/...</li> <li>• Presentation software used for producing multi media presentation for an audience/...</li> <li>• Communications software used for sending mass emails/...</li> <li>• Web authoring software used for maintaining company website.</li> </ul> (2 per point, max 2 point, max 4)	[4]	
(ii)	<ul style="list-style-type: none"> <li>• Database/to store files of customers and sales.</li> <li>• Word processor/to write to customers/mail merge to send material to specific types of customer.</li> <li>• Communications software/to send emails to customers.</li> <li>• Spreadsheets/to keep records of sales/calculate invoices.</li> </ul> (2 per point, max 2 point, max 4)	[4]	

Question	Expected Answer	Mark	Additional Guidance
(c) (i)	<ul style="list-style-type: none"> <li>• Graphs...</li> <li>• ...to show trends/thickness of sheet against time</li> <li>• Interactive presentations...</li> <li>• ...(eg touch screen) to allow report and action (increase or decrease of pressure on rollers)</li> <li>• Sound/light...</li> <li>• ...to present alarm signals/eg sheet too thick despite repeated rolling.</li> <li>• Text using flash/reverse colour/different colours/position on screen...</li> <li>• ...methods of giving a second type of information apart from what is actually stated.</li> <li>• Video/Images...</li> <li>• ...to show operator production line/eg see reason for blockage</li> <li>• Hard copy/printout...</li> <li>• ...for future reference/research.</li> </ul> <p>(1 per point, max 6)</p>	[6]	
(ii)	<ul style="list-style-type: none"> <li>• Large amount of information...</li> <li>• ...only one operator...</li> <li>• Operator might miss seeing info</li> <li>• Info must be ordered</li> <li>• Danger of information overload...</li> <li>• ...needs to be prioritised</li> <li>• Some information is crucial, like line blockage...</li> <li>• ...must be presented in way that has immediate impact</li> <li>• Use of colour must be consistent.</li> <li>• Use of sound must be minimal otherwise it will be ignored...</li> <li>• Must consider operator/is the operator colour blind/deaf/capable?</li> </ul> <p>(1 per point, max 6)</p>	[6]	

Question	Expected Answer	Mark	Additional Guidance
(d)	<ul style="list-style-type: none"><li>• Experts in the field are interviewed - Information collected from many sources</li><li>• This information is used to create a knowledge base</li><li>• The rules used to interrogate the knowledge base are collected in the rules base</li><li>• The rules are used to interrogate the knowledge base using a set of algorithms stored in the inference engine</li><li>• An HCI is set up to provide communication outside the knowledge-based system.</li></ul> (1 per point, max 4)	[4]	

Question	Expected Answer	Mark	Additional Guidance
9 (a)	<ul style="list-style-type: none"> <li>• Enables manufacturers to design for a particular layer</li> <li>• Layers are ordered...</li> <li>• ...which simplifies the creation of the protocol</li> <li>• Changes can be made by altering a single layer...</li> <li>• and the links to the other layers in contact with it</li> </ul> (1 per point, max 3)	[3]	
(b)	<ul style="list-style-type: none"> <li>• Word processed documents tend to have less data to transmit than a video file /they are smaller...</li> <li>• Word processed documents not needed immediately.</li> <li>• Bit rate for word processed documents unimportant because there is time for data to download even at slow rate.</li> <li>• Video file large/used immediately...</li> <li>• ...therefore data is time sensitive...</li> <li>• ...therefore requires a high bit rate or data becomes useless.</li> </ul> (1 per point, max 4)	[4]	

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