

**Computing**

Advanced GCE F451

Computer Fundamentals

**Mark Scheme for June 2010**

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Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Any enquiries about publications should be addressed to:

OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

Question			Expected Answer	Mark	Rationale
1	(a)	(i)	<ul style="list-style-type: none"> <li>To input data to system/bar code/card number</li> <li>eg bar code reader</li> </ul>	[2]	
		(ii)	<ul style="list-style-type: none"> <li>To give information from system to user</li> <li>eg printer to print receipt</li> </ul>	[2]	
		(iii)	<ul style="list-style-type: none"> <li>Keep data that has been collected for future use</li> <li>eg Disk drive (to store details of goods).</li> </ul>	[2]	
	(b)	(i)	<ul style="list-style-type: none"> <li>Programs that control the operation of a computer system</li> </ul>	[1]	
		(ii)	<ul style="list-style-type: none"> <li>Programs that allow the user to do something useful.</li> </ul>	[1]	
	(c)	(i)	<ul style="list-style-type: none"> <li>Local Area Network</li> <li>Computers linked together over a small area</li> <li>Hard-wired/wireless/allows communication</li> <li>Shared devices.</li> </ul> <b>(1 per •, max 2)</b>	[2]	
		(ii)	<ul style="list-style-type: none"> <li>Modem/Router/Gateway</li> <li>To alter signal between A and D/to connect to phone line/to link the LAN to a WAN.</li> </ul>	[2]	
	(d)	(i)	<ul style="list-style-type: none"> <li>10101011</li> <li>1 111</li> </ul> <b>(1 per nibble + 1 for carries)</b>	[3]	
		(ii)	<ul style="list-style-type: none"> <li>01011101/2nd byte</li> <li>Has an odd number of ones</li> <li>All others have an even number of ones/even parity</li> </ul>	[3]	

Question		Expected Answer	Mark	Rationale
2		<ul style="list-style-type: none"> <li>• Used to control the hardware of the system/resource management               <ul style="list-style-type: none"> <li>– through software like hardware drivers/system software</li> </ul> </li> <li>• Used to provide a platform on which applications can run               <ul style="list-style-type: none"> <li>– deals with issues that the software may have with eg storage of files</li> </ul> </li> <li>• Provides a user interface with operator               <ul style="list-style-type: none"> <li>– To allow communication between user &amp; hardware</li> <li>– Different types/mention of type...</li> <li>– ...for different circumstances/sensible example</li> </ul> </li> <li>• Handles communications               <ul style="list-style-type: none"> <li>– using rules/protocols to govern the communication</li> <li>– mention of protocol/sensible rule</li> </ul> </li> <li>• Handles translation of code               <ul style="list-style-type: none"> <li>– Compiler/Interpreter</li> </ul> </li> <li>• Has many utility programs               <ul style="list-style-type: none"> <li>– used to carry out housekeeping on system/example</li> </ul> </li> </ul> <p><b>(1 per •, max 4 pairs, max 8)</b></p>	<b>[8]</b>	
3	<b>(a)</b>	<ul style="list-style-type: none"> <li>• ROM non volatile/RAM volatile</li> <li>• ROM normally smaller than RAM</li> <li>• Data on ROM cannot be changed, on RAM it can</li> </ul> <p><b>(1 per •, max 2)</b></p>	<b>[2]</b>	
	<b>(b)</b>	<p><b>(i)</b></p> <ul style="list-style-type: none"> <li>• Will not need to be changed</li> <li>• Cannot be changed</li> <li>• Will not need loading/installing</li> <li>• Immediately available when switched on</li> </ul> <p><b>(1 per •, max 2)</b></p>	<b>[2]</b>	
		<p><b>(ii)</b></p> <ul style="list-style-type: none"> <li>• Need to allow user to enter data</li> <li>• Processor must have some RAM as working memory/buffer</li> <li>• Used to load data from disk when playing/currently running programs/data in use</li> </ul>	<b>[2]</b>	

Question		Expected Answer	Mark	Rationale
4	(a)	<p><b>Mark band 6-8. High level response.</b>  Candidate has explained the importance of <b>and</b> described some methods of fact finding in detail.  Candidate has discussed suitability of more than one method for particular situations.  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 explained the importance and described some methods of fact finding.  Candidate has mentioned more than one method for a particular situation and has discussed the suitability of one method for a particular situation.  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 points about the importance of or listed methods of fact finding.  There will be a lack of cohesion in the response.  Candidate will fail to use correct technical terms in the response.  Spelling and grammatical errors affect the readability of the response.</p>		

Question		Expected Answer	Mark	Rationale
		<p><b>Points will include:</b></p> <ul style="list-style-type: none"> <li>• Need to ensure analyst understands the organisation requirements...</li> <li>• or system produced may not meet requirements</li> <li>• Need to ensure correct hardware and software</li> <li>• Interview/one to one situation/can change course of questions/Boss or client</li> <li>• Questionnaire/many have their views considered/time saving/large workforce</li> <li>• Observation/can see process in action/may not act as they would because being observed</li> <li>• Meeting/can get views from many people at once/may be taken over by one or two people</li> <li>• Document collection/indicates what data is actually collected.</li> </ul>	<b>[8]</b>	
	<b>(b)</b>	<b>(i)</b> <ul style="list-style-type: none"> <li>• Input requirements</li> <li>• Output requirements</li> <li>• Processing requirements</li> <li>• Clients agreement to requirements</li> <li>• Hardware</li> <li>• Software</li> </ul>		
		<b>(ii)</b> <ul style="list-style-type: none"> <li>• Input design</li> <li>• Output design/choice of interface</li> <li>• Data structure (design)</li> <li>• Diagram of overall system</li> <li>• Processing necessary/algorithms/flowcharts</li> <li>• System flow charts</li> <li>• Data flow diagrams</li> <li>• ERD's</li> <li>• Sitemaps</li> </ul> <p><b>(1 per •, max 3 per dotted, max 2 for diagrams, max 6)</b></p>	<b>[6]</b>	<ul style="list-style-type: none"> <li>• JSDs</li> <li>• Pseudocode</li> <li>• UML diagrams</li> <li>• Validation/verification</li> </ul>

Question			Expected Answer	Mark	Rationale
5	(a)	(i)	<ul style="list-style-type: none"> <li>• 01011101</li> </ul> <b>(1 per nibble)</b>	[2]	
		(ii)	<ul style="list-style-type: none"> <li>• 1 3 5</li> </ul> <b>(1 for 13, 1 for 5)</b>	[2]	
		(iii)	<ul style="list-style-type: none"> <li>• bits taken in groups of 3...</li> <li>• ...from right</li> <li>• converted to denary, gives octal</li> </ul> <b>(1 per •, max 2)</b>	[2]	
6	(a)	(i)	<ul style="list-style-type: none"> <li>• 11000100</li> </ul> <b>(1 per nibble)</b>	[2]	
		(ii)	<ul style="list-style-type: none"> <li>• 93 turned into 01011101</li> <li>• <math>93-51=93+(-51)</math></li> <li>• <math>(-51)=11001101</math></li> <li>• 100101010</li> <li>• Ignore carry/00101010</li> </ul> <b>(1 per •, max 4)</b>	[4]	
6	(a)	(i)	<ul style="list-style-type: none"> <li>• A set of rules...</li> <li>• ...to control communication (between devices)</li> </ul>	[2]	Accept "instructions" for "rules"
		(ii)	<ul style="list-style-type: none"> <li>• A handshake signal (is sent from one device...)</li> <li>• ...and acknowledged by the other</li> <li>• This states that both are now ready for communication</li> <li>• Unless both devices follow the same rules there can be no communication</li> </ul> <b>(Any 2 of the first 3 •, + last •, max 3)</b>	[3]	Accept "logical parts of protocol need to be agreed"

Question		Expected Answer	Mark	Rationale
	(b)	(i) <ul style="list-style-type: none"> <li>• Baud rate</li> <li>• Error correction technique</li> <li>• Routing</li> <li>• Flow control</li> <li>• Synchronisation</li> <li>• Rules governing data</li> </ul> <b>(1 per •, max 3)</b>	[3]	<ul style="list-style-type: none"> <li>• Compression type</li> <li>• File type</li> <li>• Packet size</li> </ul>
		(ii) <ul style="list-style-type: none"> <li>• Description of the physical connections between devices</li> <li>• Wireless/hard wired</li> <li>• What frequencies?</li> <li>• Serial or parallel?</li> <li>• Radio/microwaves/infra-red/laser...</li> <li>• Copper cable or fibre optic?</li> </ul> <b>(1 per •, max 3)</b>	[3]	
	(c)	<ul style="list-style-type: none"> <li>• Passwords <ul style="list-style-type: none"> <li>– restrict access to system/files/keep secure by using mixture of cases/characters...</li> </ul> </li> <li>• Use of a firewall <ul style="list-style-type: none"> <li>– to stop signals from unauthorised users reaching the system/hardware or software</li> </ul> </li> <li>• Encryption <ul style="list-style-type: none"> <li>– so that if unauthorised access is gained the data is unintelligible</li> </ul> </li> <li>• Proxy server <ul style="list-style-type: none"> <li>– restricts the users allowed access to individual machines on network</li> </ul> </li> <li>• Intrusion detection system <ul style="list-style-type: none"> <li>– warns when uninvited access is attempted</li> </ul> </li> </ul> <b>(1 per •, max 3 pairs, max 6)</b>	[6]	<ul style="list-style-type: none"> <li>• File backup <ul style="list-style-type: none"> <li>– Files can be recovered after corruption</li> </ul> </li> <li>• Anti-spyware</li> </ul>

Question	Expected Answer	Mark	Rationale
7	<p><b>(i)</b></p> <ul style="list-style-type: none"> <li>• eg Tourist information system</li> <li>• eg Touch screen/pointing device               <ul style="list-style-type: none"> <li>– Simple to use</li> <li>– Limited choices</li> <li>– Suitable for environment</li> </ul> </li> </ul> <p><b>(1 per •, max 2 of indented points, max 4)</b></p>	<b>[4]</b>	
	<p><b>(ii)</b></p> <ul style="list-style-type: none"> <li>• eg Expert systems</li> <li>• eg Keyboard or microphone               <ul style="list-style-type: none"> <li>– Allows user to use human syntax</li> <li>– Very complex systems therefore simplification of query is useful</li> <li>– User may find use of a natural syntax easier, so can focus on application</li> </ul> </li> </ul> <p><b>(1 per •, max 2 of indented points, max 4)</b></p>	<b>[4]</b>	
8	<ul style="list-style-type: none"> <li>• Correct responses will all be in predetermined positions...</li> <li>• ...which can be chosen simply by candidates</li> <li>• Answers are right or wrong</li> <li>• There are no areas for debate</li> <li>• Useful statistics produced to inform future examination questions</li> <li>• Speed of marking</li> <li>• Accuracy of marking</li>   <li>• Scripts are batch processed</li> <li>• Positions of shaded areas compared with 'correct' positions</li> <li>• Number of correct positions added...</li> <li>• ...and stored in a file according to ...</li> <li>• ...candidate number (which is also shown as shaded areas on paper)</li> </ul> <p><b>(1 per •, max 4 per section, max 5)</b></p>	<b>[5]</b>	

Question		Expected Answer	Mark	Rationale
9	(a)	<ul style="list-style-type: none"> <li>• Hard drive/removable hard drive/zip drive               <ul style="list-style-type: none"> <li>– Magnetic medium</li> <li>– Stores all her working files</li> </ul> </li> <li>• CDRW/DVDRW/CDR/DVDR               <ul style="list-style-type: none"> <li>– Optical medium</li> <li>– Used to make back up files/give copies of software to team/transport files to company offices</li> </ul> </li> <li>• USB stick/flash memory               <ul style="list-style-type: none"> <li>– Solid state medium</li> <li>– Used to transport files to company offices</li> <li>– Used to store sensitive information as she can keep it with her</li> </ul> </li> </ul> <p><b>(1 per •, one from each indent, max 2 types, max 6)</b></p>	<b>[6]</b>	
	(b)	(i) <ul style="list-style-type: none"> <li>• Ability to work at own times</li> <li>• More freedom with family</li> <li>• Save money/time on commuting               <ul style="list-style-type: none"> <li>– More easily distracted</li> <li>– Lack of social contact</li> <li>– Difficulty if system malfunctions/problem met/team communication more difficult</li> </ul> </li> </ul>		
		(ii) <ul style="list-style-type: none"> <li>• Do not need to supply offices/car parking spaces/less expensive to run offices</li> <li>• Work can be outsourced easily               <ul style="list-style-type: none"> <li>– less control over work of individuals</li> <li>– more difficulty in altering course of work/less flexible</li> </ul> </li> </ul>		– Sensitive material may be less secure at home

Question	Expected Answer	Mark	Rationale
	<p><b>(iii)</b></p> <ul style="list-style-type: none"> <li>• Less pollution from travelling/less traffic congestion</li> <li>• less infrastructure required</li> <li>• opportunities for employment of disabled people</li> <li>• less need for coalescing in cities               <ul style="list-style-type: none"> <li>– reduction in service industries</li> <li>– less structure in society</li> </ul> </li> </ul> <p><b>(1 per •, max 1 per block, max 2 per dotty, max 6)</b></p>	<b>[6]</b>	

**OCR (Oxford Cambridge and RSA Examinations)**  
**1 Hills Road**  
**Cambridge**  
**CB1 2EU**

**OCR Customer Contact Centre**

**14 – 19 Qualifications (General)**

Telephone: 01223 553998

Facsimile: 01223 552627

Email: [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

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**OCR (Oxford Cambridge and RSA Examinations)**  
**Head office**  
**Telephone: 01223 552552**  
**Facsimile: 01223 552553**

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