

GCE
Computing

Unit **F451**: Computer Fundamentals

Advanced Subsidiary GCE

Mark Scheme for June 2014

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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

Annotation	Meaning of annotation
Tick	All correct responses should be given a tick. The number of ticks must equal the mark awarded. Do not use ticks on Q3
SEEN	The two pages for the response to Q3 should have this annotation and no other.
	Other annotations may be used as desired.

Question			Answer/Indicative content	Mark	Guidance
1	a	i	<ul style="list-style-type: none"> • Local Area network • (Over) a small geographical area • Use of hard-wiring/ wireless communication 	2	
		ii	<ul style="list-style-type: none"> • Communication between machines/workers • Any machine can be used • Easier to maintain/add/delete software/files • Sharing of peripheral devices/software/data • Monitoring of workers • Simplifies backup procedures 	2	Not: Shared processing power
	b	i	<ul style="list-style-type: none"> • Individual data bits sent... • ...one after another along the communication medium/one wire/as a single stream 	2	
		ii	<ul style="list-style-type: none"> • Communication can be done in both directions... • ...at the same time 	2	
	c		<ul style="list-style-type: none"> • Hard drive... • ...to store files and software • Removable hard drive... • ...to store archive of files • CDROM/DVDROM reader... • ...for the importation of software • Memory stick/solid state device... • ...to allow transport of materials between office and home • CD(R)/DVD(R) (reader/writer...)/optical disk • ...to store back-up of files/software/portability of files • Cloud storage... • ...to make files available to others in the dept/from anywhere/on any device/backup 	6	<p>Mark as three pairs of marks. Second mark is dependent on getting the first</p> <p>Uses are all examples, other sensible uses should be credited.</p> <p>Uses can be generic, but if specific they need to be about the finance manager</p> <p>Not: USB on its own</p> <p>Only allow the same reason once e.g. 'to store files'</p>

Question		Answer/Indicative content	Mark	Guidance
2	a	<ul style="list-style-type: none"> • 0000000100111000 	2	1 for correct binary, 1 for 16 digits.
	b	<ul style="list-style-type: none"> • Normally equates to the symbols on a keyboard/digits/letters... • ...that can be represented/interpreted/understood by a computer • May include control characters 	2	Not: Stored on a computer
	ii	<ul style="list-style-type: none"> • Each symbol has a (binary) code/number... • ...which is unique. • Number of bits used for one character = 1 byte • Example code: ASCII/Unicode... • ...uses 8 bits/16 bits per character • Use of more bits for extended character set 	3	
	c	<ul style="list-style-type: none"> • Data input twice • The two inputs are compared <u>by computer</u> 	2	
	ii	<ul style="list-style-type: none"> • Range check... • ...Parameters imposed beyond which the data cannot go • ...eg Tin of beans must be between 0.10 and 1.50 • Length check... • ...The maximum number of characters is specified • ...Price of a tin of beans must be three characters • Type check/character check... • ...data matches the data type specified • ...eg characters must be digits • Format check/input mask... • ...the form that the data must take is specified • ...eg price must contain two places of decimals 	4	<p>1 per bullet, max 2 per type, max two types</p> <p>Second point does not need the correct name to be given mark, but it must not contradict</p> <p>Not: Presence check/existence check/checksum/check digit</p>

Question		Answer/Indicative content	Mark	Guidance
d		<ul style="list-style-type: none"> • Barcode of item purchased is read at checkout/it is scanned in • Barcode is compared with barcodes stored on stock file • (Field containing) number of tins of beans is decremented • New value is compared with the field containing the minimum number of tins of beans that are allowed • If number of tins in stock is less than minimum stock/value is below limit... • ...and no order is outstanding for this item... • ...search supplier file for details of supplier and use these details either to place an order automatically or produce report for manager • Set field showing outstanding order • When order arrives, number in stock (field) is incremented 	6	<p>Note: This is intended to be a difficult question. Mark points need to be fairly precise – do not read too much into a response</p>

Question		Answer/Indicative content	Mark	Guidance
3		<p>Mark band 6 – 8 Higher level response Candidate has named and described a full range of stages required after the design stage of the life cycle and has described more than one type of documentation that can be used. There will be a logical order to the stages or they will be related to each other. Candidate has used appropriate technical terminology throughout. There are few if any errors of grammar or spelling errors.</p> <p>Mark band 3 – 5 Medium level response Candidate has named and described a number of stages required after the design stage of the life cycle and has described at least one type of documentation that can be used. There may be an order to the stages although this order may not be fully explained. Candidate has used some appropriate technical terminology in the response. There may be errors of grammar or spelling errors in the response but they are not obtrusive.</p> <p>Mark band 0 – 2 Low level response Candidate has explained at least one stage required after the design stage of the life cycle or has described at least one type of documentation. Candidate has failed to use technical terminology. There are likely to be spelling errors and/or errors of grammar which will disrupt the flow of the response.</p> <p>Answers may include: Coding System testing to make sure that the system works as described in the specification by: Testing each individual system function Testing each function with extreme, normal and abnormal data</p>	8	Place a 'seen' annotation on both pages of the space for the response even if it is NR High level: Full range of stages of the life cycle + at least two sets of documentation described Middle level: A number of stages + two sketchy levels of documentation or All the stages + one documentation Low level: Some stages OR a description of some documentation. Once the level is established the quality of the response decides which of the three marks it gets for that level Be wary of well written response full of lots of detail about the systems life cycle but no documentation. It has a maximum mark of 2. Ignore anything about the life cycle that does not come after the design stage chronologically

Question	Answer/Indicative content	Mark	Guidance
	<p>Testing that system produces correct results for specific data input</p> <p>Installation planning to include an analysis of the following methods and their suitability in the library:</p> <ul style="list-style-type: none"> Parallel running Direct changeover Pilot running Phased implementation <p>Consideration of maintenance procedures</p> <p>Adaptive/Perfective/Corrective</p> <p>System review and reassessment understanding that the solution has a limited life span and that obsolescence brought about by new hardware and software techniques will always require further work.</p> <p>The documentation will include descriptions of:</p> <ul style="list-style-type: none"> User documentation Technical documentation System documentation <p>Including in each case an explanation of why it is needed and some of the items that will be contained.</p>		

Question			Answer/Indicative content	Mark	Guidance
4	a	i	<ul style="list-style-type: none"> Allows data to be given/entered (into the computer) 	1	Allow specific inputs like 'answers to questions' or allows user to interact with software/hardware Not: a piece of hardware
		ii	<ul style="list-style-type: none"> Reports the results of processing (to the user)/shows state of software (to user) 	1	Allow: Lets hard copy be produced
	b	i	<ul style="list-style-type: none"> Movement of images on the screen Used to illustrate weather systems which would otherwise not be possible 	2	Two mark points are: Movement and weather systems
		ii	<ul style="list-style-type: none"> The next image/stage presented is determined by the input determined by the user Questions may be asked about one stage and the software will move to a next stage determined by the response to the question given. 	2	Two mark points are: Output determined by student input and an example (eg question asked and answered or hyperlink/hot button chosen...)
5	a		<ul style="list-style-type: none"> Holds the instruction while it is being decoded/executed Contents are split into two parts... Operation code is first part of instruction... ...operation code is decoded (so that CU knows what to do) Rest of the content is address of data to be used with the operation/actual data to be used (if immediate operand is used)... ...operand is copied to MAR if it is an address ...operand is copied to MDR if it is data 	6	1 per bullet max 6. These need to be fairly precise as it is a technical question Note: 'Instruction' in the first mark point may be referred to as 'data'
	b		<ul style="list-style-type: none"> Control bus... ...transmits control signals from the control unit (to other parts of the processor) Data bus... ...carries the data (from one place to another) Address bus... ...carries the location address (register) where the data is going (to or from) 	6	These are the expected responses as they are the buses listed in the specification, however, other responses are acceptable, for example named buses like 'EIDE, a local bus' and 'Video bus to maintain screen display'. Serial and parallel buses are not acceptable because they are not named. Not a memory bus Control bus does not send program instructions. Examples would include interrupt signals/read/write operation carried out

Question		Answer/Indicative content	Mark	Guidance
6	a	<ul style="list-style-type: none"> • Passwords needed to access the database... • ...restricts access to data to those who know the password/authorised personnel • UserIDs to identify the person who has accessed the data... • ...allows for auditing whoever has accessed the material • Firewall... • ...can limit access to particular external machines • Proxy server... • ...hardware that accesses data for external users without allowing access to the database • Protocol based protection like SSL... • ...allows for an encrypted link between devices to stop third party access • Encryption of the data • ...so that, even if accessed, data cannot be read • Backup data... • ...provides a copy of the data in case of corruption 	6	<p>1 per bullet, max 3 types, max 6.</p> <p>Not: Connecting to Internet Anything about viruses Physical measures DPA</p>
	b	<ul style="list-style-type: none"> • Knowledge base/accept database/accept fact based... • ...contains a list of all the roads and traffic densities at different times of the day • Rule base... • ...contains rules about the possible flows of traffic, eg one-way streets. • Inference engine/accept search engine... • ...applies the rules to the knowledge base to decide which routes are available from A to B • (User) interface... • ...To allow input of parameters <u>and</u> output of results eg a particular route to show the probability of a traffic jam forming. 	8	<p>The way that each part relates to the council system is simply an example and other uses are acceptable, but must be council/traffic flow related and not just generic. Exception is to allow a general description for the interface.</p>

Question		Answer/Indicative content	Mark	Guidance
7	a	<ul style="list-style-type: none"> • Data is split into equal sized blocks (called packets) • Each packet has a header of information(including destination address and the place of the packet in the complete message) • (Each packet is placed on the network and) each may travel by a different route • (At each node on the network the destination address is read and the) best route is found • Packets need to be <u>reordered</u> at the destination 	5	For 'reordered' accept reorganised or similar, but NOT 'reassembled'.
	b	<ul style="list-style-type: none"> • Transmission is safer from interception... • ...because it is impossible to intercept all the packets as they use different routes • Very <u>efficient use of network</u>... • ...as each channel only used for short time/ does not tie up a part of the network • If there is an error then only a small, identifiable, part of the data is affected... • ...this can be retransmitted easily 	4	<p>1 per bullet, max 2 pairs of bullets. Can award marks for opposite points made about Circuit Switching but do not give explanation mark Efficient use, not speed</p> <p>Do not credit anything about speed of transmission of the file</p>
	c i	<ul style="list-style-type: none"> • 10101010 • Three bytes have an odd number of ones and as there is only one error odd parity is being used • This byte has an even number of ones. 	3	
	ii	<ul style="list-style-type: none"> • The bytes are added together... • ...101110110 • Any carry out of the byte is ignored... • ...01110110 • This is sent with the data • The same sum is done at the receiving end and the results compared 	6	<p>Accept any indication that addition has been done, not just any old calculation</p> <p>Accept: The value is calculated at the receiving end and returned to sender for comparison. This would get the last two mark points</p>

Question		Answer/Indicative content	Mark	Guidance	
8	a	<ul style="list-style-type: none"> • The software necessary to allow the system to be used without an understanding of the underlying hardware/operating system • A series of choices are offered to the user • No other options are available to the user • Different choices lead to different follow on choices • There are options to go back one level or to return to the home screen • Suitable example eg online banking application 	4	<p>Watch for dropdown boxes or icons or any other indication that this is a GUI or a WIMP. Probably scores 0</p> <p>3 marks maximum for description, 1 mark for example</p> <p>Any reasonable example. Be generous</p>	
	b	i	<ul style="list-style-type: none"> • A system which shares processing (between the processors on a network)/shares the data between different systems (on a network in order to reduce bottlenecks). 	1	
	c	<ul style="list-style-type: none"> • File handling... • ...allowing Access to, and manipulation of, files dependent on the identity of the user • Handling communication... • ...controls the movement of data around the network (by use of agreed protocol) • Resource sharing/resource management... • ...ensure fair allocation of resources/volume of printout allowed/etc • Automatic backup... • ...so that data is not lost if it is corrupted 	4	Max 2 facilities	

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