GCE

Computing

Advanced Subsidiary GCE

Unit **F451**: Computer Fundamentals

Mark Scheme for January 2013

1.   **Annotations**

Annotation	Meaning
	Omission mark
	Benefit of doubt
	Subordinate clause/Consequential error
	Cross
	Expansion of a point
	Follow through
	Not answered question
	Benefit of doubt not given
	Point being made
	Repeat
/	Slash
✔	Tick
	Too vague
0	Zero (big)

2.   **Subject-specific Marking Instructions**

that apply across the whole question paper to be included here.

Question			Answer	Marks	Guidance
1	(a)		• A peripheral device/piece of hardware/outside the processor or computer/additional to main memory • Stores data in electronic/magnetic/optical/solid state form • Retains data when the power is switched off/long term storage/accessed later/not volatile (1 per bullet, max 2)	2	Nothing for an example.
	(b)		• Magnetic storage device eg Hard drive • stores all her working files/software • Optical storage device: CDRW/DVDRW/CDR/DVDR • Used to make backup files/transport files to or from office • Solid state storage eg USB stick/flash memory • Used to make backup files/transport files to or from office • Internet based storage e.g. cloud • Any of the reasons, justified (1 per bullet, max 2 pairs, max 4)	4	Name of device is enough. Do not allow any form of ROM. Only allow each use once. Use needs to be specific to question 'transport files to office' not just 'transport data from one place to another'. Other, explained, answers acceptable. No distinctions based on scale. Mark for reason is reliant on device. Allow named devices without uses.
	(c)		Advantages: • Being able to work at own times/more flexible (with planning of time) • More freedom/time with the family • Save money/time on commuting Disadvantages: • More easily distracted • Lack of social contact/feel isolated • More difficult to get advice from colleagues/boss • Difficult to impress boss/gain recognition • lack of access to all resources in office • Difficulty if computer communications malfunction (1 per bullet, max 5) (max 3 advs or disadv)	5	Note: '…to the journalist…'

Question			Answer	Marks	Guidance
2	(a)		PC • Contains the address… • …of the next instruction to be carried out MAR • Contains the address of the next location to be accessed in the memory • May be the address of the next instruction… • …copied from PC or • Address of next data item to be used… • …copied from address part of instruction held in CIR (1 per bullet, max 2) MDR • Contains the contents of the address specified in the MAR/contains data currently being used by the processor • The contents may be an instruction (to be passed to the CIR) or… • …data to be used with an instruction or… • …data to be copied into an address (1 per bullet, max 2)	6	Note: PC does not contain the instruction. Evidence can overlap the three registers Important to credit what the candidate has written down and not to read into the response.
	(b)		eg: • Control bus • transmits control signals (from the control unit) to the rest of the processor • Address bus • carries the location of the register where the data is going • Data bus • carries the data from one register to another (1 per bullet, max 2 per pair, max 3 pairs, max 6)	6	Accept for two marks each: I/O bus; all I/O devices connected Video bus; maintains screen display Local bus; dedicated to specific purpose e.g. moving data to hard disk (EIDE/IDE/VESA/PCI/IEEE/SCSI as example types of local bus) (NOT: serial/parallel, not named bus.)

Question			Answer	Marks	Guidance
3	**(a)**		• Interviews • …Allows the analyst to change the questions asked dependent on the answers elicited • Observation • …Allows the analyst to see the way the system operates/first hand • Document collection • …Allows the analyst to see the data that needs to be collected and the outputs that are required • Meetings (of homogenous groups)/focus group • …The views of large numbers can be heard in relatively short time (1 per bullet, max 2 pairs, max 4)	4	Not just 'follow-up questions'. Answers must distinguish from questionnaires. Not 'System documentation' if referring to user or technical documentation.
	(b)		**High level response (6–8 marks)** Candidate has described a full range of stages required in the analysis stage of the life cycle and has explained the use of more than one type of diagram 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 spelling errors or errors of grammar. **Medium level response (3–5 marks)** Candidate has described a number of stages required in the analysis stage of the life cycle and has explained a type of diagram that the analyst would use during the analysis. There will be little attempt to produce a coherent structure, the items explained being presented as individual items not linked to each other. Candidate has used some appropriate technical terminology in the response. There may be spelling errors or errors of grammar in the response but they are not obtrusive. **Low level response (0–2 marks)** Candidate has named and/or described/explained at least one stage in the analysis of a problem or one type of diagram that may be appropriate. Candidate has failed to use appropriate technical terminology. There are likely to be spelling errors and/or errors of grammar, which will disrupt the flow of the response.	8	Range of stages in logical order + description of more than one type of diagram. Typically the candidate will demonstrate an understanding of the need to analyse the information collected and will give the use of data flow and structure diagrams. Range of stages in the analysis of the problem though little thought given to the logical order. The description of one type of diagram. Typically the candidate will describe a feasibility study and will mention the use of a data flow diagram One or more stages described OR description of a type of diagram used. Typically the candidate has described the design of the solution rather than the analysis of the problem.

Question	Answer	Marks	Guidance
	Explanations to be made re stages may include: • A feasibility study will be carried out • The outputs required from the system • The inputs used in order to be able to produce the required outputs • The forms that the inputs and outputs take • The types of data that are held • The form in which the data is held • The data structures used to hold the data and their relationships • The hardware used • Inadequacies of the current system • The processing of the data required • The agreement with the client of a requirements specification The diagrams described may include explanations of: Data flow diagram/to show how data moves through the system including where it comes from, what processing is carried out and where the results go to including the storage of data as required System flowchart/shows the flow of the data through the processes and the individual programs necessary to produce the desired results/specific types of hardware may be stated. Other types of diagram may include mention of information flow diagram/Entity relationship diagram/a hierarchical structure diagram Higher level responses may include awareness that the output is the requirement and that the other requirements that result from the analysis stage start from there. Points may include: • Information collected must be collated • Data required is dependent on outputs required which in turn dictates the required input to the system • The processing required dictates the type of storage to be used and the data structures required • The form of the output will dictate the peripheral devices that are used		Note: 'Flow charts' and 'JSDs' are not acceptable as they are part of the design section.

Question			Answer	Marks	Guidance
4	(a)		• Applications packages allow the user to do something useful/something that would have had to be done if there had been no computer • is a complete set of related pieces of software/contain documentation describing the software to the user • Suitable example of a type of package (1 per bullet, max 2)		
	(b)	(i)	• Commands are typed into the computer… • …at a prompt • User must know the commands available and the syntax/no attention paid to the aesthetics of the system • Allows access to whole system/many more possibilities than a GUI • Uses fewer resources than other interfaces • Access to required operations is faster than using other interfaces (1 per bullet, max 2) • eg the technician responsible for maintaining a school network system (max 2 for characteristics and 1 for use, max 3)	3	Do not accept 'programmers'

Question			Answer	Marks	Guidance
		(ii)	• Used to control the hardware of the system/resource management… • …through software like hardware drivers/system software/task management • Used to provide a platform on which application software can run… • …deals with issues that the software may have eg the storage of files/allows user to have access to hardware • Handles communications between devices/computers… • …using rules/protocols to govern communication/mention of sensible protocol/rule • Handles translation of code… • …compiler/interpreter/(assembler)/need to translate HLL/LLL into machine code • Has many utility programs… • …used to carry out housekeeping on the system/maintain the hardware/example • Memory management… • …paging/segmentation/virtual memory • Job scheduling… • …provides fair access to processor according to set rules/example • Provides security… • …eg through password system • Interrupt handling… • …example type/priorities • Dictates how the system will operate… • …suitable example e.g. multi user/protects access to user files (1 per bullet, max 3 pairs, max 6)	6	Example utility program described is worth 2 marks. Allow: 'controls firewall' Example type of OS described is worth 2 marks.
	(c)	(i)	• Only one user can use the machine **at a time** • Multi-tasking operating system means that (apparently) more than one task can be carried out at a time	2	
		(ii)	• A multi-user system allows a number of users to use **one computer** at the same time • A network system allows **a number of computers** to share other resources at the same time	2	Not: '…use the same system at once', needs to be a computer

Question			Answer	Marks	Guidance
5	**(a)**	**(i)**	• Marks placed by user in specified location/in certain places on paper • Reader identifies location of mark not type of mark • Location of mark equates to value to be read (1 per bullet, max 2) • eg Used in multi choice exams • Limited number of possible answers/makes marking very **fast**/accurate…	4	Question specifies 'recognition' NOT 'reader' Note: accept evidence across example and justification
		(ii)	• Image of character recorded (using bitmap image) • image compared to library of possible characters (for best fit) • eg Reading printed documents (for the blind) • Software can turn the characters into audible output	4	Question specifies 'recognition' NOT 'reader' Note: accept evidence across example and justification
	(b)		The following are example answers other suitably explained answers are equally appropriate. **Input:** • Concept keyboard to key in orders/small number of options • Qwerty/standard keyboard/to alter values stored in the computer system • Touch screen (with options shown on screen)/allows for input of customer orders/allows for quick alterations to options available **Output:** • Monitor/Screen/LED display/to show the total amount payable • Printer/to print a hard copy receipt (2 per bullet, max 2 input and 2 output, max 8)	8	Not just 'keyboard' Accept chip and pin, keypad, credit card reader, magnetic stripe reader Accept 'beeper' to indicate correct input or equivalent Not just 'display'
	(c)	**(i)**	• The comparison of the input data with rules that the data must follow • Validation carried out by the computer/system, not the user • Checks data for being sensible/not for being correct (1 per bullet, max 2)	2	Not 'expected data'

Question			Answer	Marks	Guidance
		(ii)	• Length check/Range check • …The number of characters read must be correct for the expected length of a barcode/The numeric value must be less than a maximum amount • Existence check • …The barcode must exist in the file of goods on sale in the store • Type check • …To ensure that the characters are all numeric • Check digit • …to catch transposition error in input data (1 per bullet, max 2 pairs, max 4)	4	Do not accept: Picture check; format check; presence check Mark for description is independent of mark for name of check
6	(a)		• Path is reserved between the two computers… • …for the duration of the transmission • No other data can use any part of this circuit until the transmission is complete • Data is divided into packets of equal size which are… • …sent down the circuit in the correct order (1 per bullet, max 3)	3	
	(b)		• CS establishes a route for the duration of the message/PS has no established route • CS sends packets all on same route/PS means packets being sent on individual routes • CS message can be intercepted if route can be tapped into/PS is more secure because packets all use different routes • CS packets remain in correct order (but must be reassembled)/PS packets arrive out of order (and must be reordered) • CS ties up large areas of the network for duration of message/PS maximises use of network (2 per bullet, max 3 bullets, max 6)	6	Do not allow anything to do with cost or speed. No crossover between numbered poAccept 'monitors'nts.

Question			Answer	Marks	Guidance
7	(a)		• A set of rules… • …to allow communication between devices	2	
	b)		The following are examples, other answers are acceptable • Bit rate/Baudrate • …to ensure transmitting and receiving devices are both using the same rate/states the rate at which data is transmitted • Character set to be used • …if the sets are different then the receiving device will misinterpret the data that is sent/decide whether to use ASCII or Unicode or … • Software used • …to ensure that the data is compatible with the software • Form of data encryption • …to allow data to be decrypted at destination • Type of transmission to be used • …eg parallel or serial/duplex or simplex/ frequency of wireless transmission/packet size • Type of medium used to carry the transmission • …eg single/multiple wires or cable/wireless or copper/fibreoptic or radio/microwaveor frequency if wireless transmission used (1 per bullet, max 4 pairs, max 8)	8	
8	(a)	(i)	• 01001011 (1 for the leading 0 and 1 for 1001011)	2	
		(ii)	• 01110101	1	
		(iii)	• 113	1	
		(iv)	• 4B (1 per digit, max 2)	2	

Question			Answer	Marks	Guidance
	(b)		Either • Bits taken in groups of 3… • …from the LSB • Each group of 3 bits converted to denary/octal OR • 01 001 011 • 1 1 3	3	

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