

Computing

Advanced Subsidiary GCE

Unit **F451**: Computer Fundamentals

Mark Scheme for June 2012

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| Question | | | Answer | Marks | Guidance |
|----------|-----|-------|--|-------|---|
| 1 | (a) | (i) | <ul style="list-style-type: none"> Hardware is physical parts of the system | 1 | |
| 1 | (a) | (ii) | <ul style="list-style-type: none"> Software is instructions/code/programs/... | 1 | |
| 1 | (b) | | <p><i>Systems software</i></p> <ul style="list-style-type: none"> Controls the hardware of the computer/runs the system/makes the hardware work Gives a platform to run other software/allows access to other software Acts as an interface between the hardware/processor and the outside world/user <p><i>Applications software</i></p> <ul style="list-style-type: none"> Makes the hardware do something useful A collection of compatible software Complete with user guides, electronic or hard copy | 4 | (1 per •, max 4, max 3 per type) Allow one example of each type (not proprietary, not just "operating system", but allow bootstrap & BIOS) |
| 1 | (c) | (i) | <ul style="list-style-type: none"> Movement of images (on screen)... ...used to hold the attention of the children/relate numbers to images | 2 | |
| 1 | (c) | (ii) | <ul style="list-style-type: none"> The next image presented is dependent on the input provided by the user/requires input from the user... ...eg difficulty of next question depends on whether or not child got present question right | 2 | |
| 1 | (c) | (iii) | <ul style="list-style-type: none"> (Hard copy) outputs summarising the previous group of inputs... ...eg printout of the scores of the children in a class for the teacher | 2 | |

| Question | | Answer | Marks | Guidance |
|----------|-----|--|-------|---|
| 2 | (a) | (i) <ul style="list-style-type: none"> • The two people involved will have very different ideas of the problem • Necessary that they solve the problem that they agree on... • ...or manager will be unhappy/software will be useless • ...analyst will not be paid • may solve wrong problem/ensure correct problem is solved (ii) <ul style="list-style-type: none"> • Analyst is expert in use of <u>computers</u> and what is possible/can decide if problem is feasible to solve • Manager is expert in area of <u>problem</u>/company | 4 | Allow: solution to incorrect problem may cause other problems to be created (1 per •, max 2) (1 per •, max 2) |
| 2 | (b) | (i) <ul style="list-style-type: none"> • Is the solution technically feasible? • Is the solution economically feasible? • Is the workforce capable of running the new system? • Is the budget sufficient to cover the costs expected? • Is the solution socially acceptable? • Is the proposed system legal? • Is the proposed system possible in the given time period? | 4 | (1 per •, max 4) Not environment |

| Question | | | Answer | Marks | Guidance |
|----------|-----|------|--|-------|---|
| 2 | (b) | (ii) | <p>Answers to individual points may include:</p> <ul style="list-style-type: none"> • Does a powerful enough communication medium exist/are all the workers able to access broadband • Will the improvements that will be brought about by the new solution cover the costs of producing it • What training will be required and will it be successful/worthwhile • The company will have an idea of the cost, will the analyst be able to produce it for that cost • Will the workers be happy to work different hours or could the change cause trouble • Will the transmission of sensitive material be legal/do the safeguards available for the data make it secure • The work is expected in eg six weeks, what are the penalties if it is not finished/how long does the analyst envisage the work will take | 4 | (1 per •, max 4, responses should match those in (i)) |

| Question | | Answer | Marks | Guidance | |
|----------|-----|--|-------|--|--|
| | | | | Content | Levels of response |
| 3 | (a) | <p><i>Points to be made re named parts of computer may include:</i></p> <p><i>Control unit:</i></p> <ul style="list-style-type: none"> • Manages execution of instructions... • ...by using control signals to other parts of the computer • Synchronises actions/using inbuilt clock <p><i>Memory unit:</i></p> <ul style="list-style-type: none"> • Stores O.S.... • ...data currently in use... • ...software currently in use <p><i>ALU:</i></p> <ul style="list-style-type: none"> • Carries out arithmetic instructions/calculations • Carries out logical instructions/decisions • Acts as a conduit through which all I/O to computer is carried out/gateway to the processor <p><i>Points to be made re buses may include:</i></p> <p>Data bus</p> <ul style="list-style-type: none"> • ...carries data being transmitted <p>Address bus</p> <ul style="list-style-type: none"> • ...carries identification about where the data is being sent/coming from <p>Control bus</p> <ul style="list-style-type: none"> • ...carries control signals from control unit to allow synchronisation of signals/commands to processor | 8 | <ul style="list-style-type: none"> • (Controls fetch/execute cycle) Note: Paper 3 <p>(I/O bus, all I/O devices are connected Video bus, maintains screen display Local bus, dedicated to specific purpose for moving data eg to hard disk: EIDE/IDE/VESA/ PCI/IEEE/SCSI all are types of local bus)</p> | <p>Mark band 6 – 8. Higher level response Candidate has described all three parts of the computer named and has identified more than one type of bus and described their use. Candidate has used appropriate technical terminology throughout. There are few if any spelling errors or errors of grammar.</p> <p>Mark band 3 – 5. Medium level response Candidate has described at least two of the parts of the computer named and has identified at least one type of bus and described its use. 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.</p> <p>Mark band 0 – 2. Low level response Candidate may have described one of the parts of the computer named and/or may have identified one type of bus with a brief description of its use. 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.</p> |

| Question | | | Answer | Marks | Guidance |
|----------|-----|-------|--|-------|--|
| 3 | (b) | (i) | <ul style="list-style-type: none"> RAM is volatile/ROM is not volatile RAM is amendable/ROM cannot be altered RAM is large/ROM is small | 2 | (1 per •, max 2) |
| 3 | (b) | (ii) | <ul style="list-style-type: none"> Boot/bootstrap/start-up software Needs to be present in memory when computer is turned on | 2 | |
| 4 | (a) | (i) | 01111011 | 1 | |
| 4 | (a) | (ii) | 0001 0010 0011 | 3 | (1 per group, max 3) |
| 4 | (b) | (i) | 11001011 | 2 | (1 per nibble, max 2) |
| 4 | (b) | (ii) | $\begin{array}{r} 123 - 53 = 123 + (-53) \\ = 01111011 \\ \quad \underline{11001011} + \\ 101000110 \\ = 70 \end{array}$ | 4 | (Max 4) 1 for + 1 for ft of their answers for 123 & -53 1 for carried (1)11110110 1 for removal of MSB provided carries in evidence 1 for 70 after binary working |
| 5 | (a) | (i) | <ul style="list-style-type: none"> A 'one-off' problem There will be no solution available to use 'off-the-shelf' Information used in the software is commercially sensitive to the company | 2 | (1 per •, max 2) |
| 5 | (b) | (i) | Store records of customers/workers/jobs/... | 1 | |
| 5 | (b) | (ii) | Production of documents like contracts/ letters to customers/staff training/... | 1 | |
| 5 | (b) | (iii) | Produce advertising material to show to groups of customers/graphical results... | 1 | |

| Question | | | Answer | Marks | Guidance |
|----------|-----|------|--|-------|--|
| 5 | (c) | (i) | <ul style="list-style-type: none"> • Knowledge base • ...stores details of all the valves and the actions to be taken • Rule base • ...stores the rules which should be applied to the knowledge to obtain information • Inference engine/algorithms • ...applies the rules to the knowledge in order to obtain valid information • HCI/user interface • ...allows engineer to input data and obtain information | 6 | (1 per •, max 3 pairs, max 6) Alternative to inference engine is algorithms |
| 5 | (c) | (ii) | <ul style="list-style-type: none"> • Data would be taken from the valve including... • ...type and make of valve • ...position of valve • ...use to which valve is put • Data would be read from the valve while in operation... • ...and input to the system • Engineer would ask questions by responding to prompts from the system • System would give answers to queries based on the knowledge base... • ...with a probability attached to each response | 3 | (1 per •, max 3) 1 mark only for sensible data |

| Question | | | Answer | Marks | Guidance |
|----------|-----|-------|---|-------|--|
| 6 | (a) | (i) | <ul style="list-style-type: none"> Computers are remote... ...typically each computer will have its own peripherals rather than sharing them Communication links are normally supplied by a third party/typically telephone lines/microwave/satellite | 2 | (1 per •, max 2) |
| 6 | (a) | (ii) | <ul style="list-style-type: none"> Router/modem... ...to act as a gateway to the WAN Communication link/telephone line/broadband connection/ satellite link/... ...provided by a third party/space on link is rented from provider Firewall... ...to ensure communications are restricted to authorised users/stop hacking Proxy server/email server ...to allow all computers to access WAN as though it were one computer | 4 | (1 per •, max 4) Do not credit mention of viruses |
| 6 | (b) | (i) | Communication is only ever in one direction | 1 | |
| 6 | (b) | (ii) | Communication can be in both directions simultaneously | 1 | |
| 6 | (b) | (iii) | Communication can be in both directions but only one at a time | 1 | |

| Question | | | Answer | Marks | Guidance |
|----------|-----|------|--|-------|--|
| 6 | (c) | (i) | <p><i>Answers may include:</i></p> <p><i>Error capture method</i></p> <ul style="list-style-type: none"> • Must agree on method or correct data will never be accepted • Type of parity/echoing back/check sum (2 for 2 marks, or 1 explained) <p><i>Medium for communication</i></p> <ul style="list-style-type: none"> • Use of cable/wireless/... • Type of cable/frequency for communication <p><i>Mode of transmission</i></p> <ul style="list-style-type: none"> • Simplex/duplex/half duplex • Serial/parallel (+2nd mark for explanation) | 4 | <p>(1 per •, max 4)</p> <ul style="list-style-type: none"> • File handling/FTP explained/size & data types • Code used to communicate/ASCII/Unicode • Software used/e.g. proprietary software, file types |
| 6 | (c) | (ii) | <ul style="list-style-type: none"> • Some data does not need to be used immediately • Downloaded to storage (so does not need to be transmitted at a fast rate) • This information is not time sensitive because it will be saved • eg sales figures from one region for the preceding month... <ul style="list-style-type: none"> • Some data must be used in real time • This data is time sensitive because (if it is not used immediately) it loses its value • eg a video conference between the managers at the two offices <ul style="list-style-type: none"> • bit rate comparison | 6 | <p>(1 per • max 6)</p> <p>Reserve 2 marks for distinguishing between examples.</p> |

| Question | | Answer | Marks | Guidance | |
|----------|--|--|-------|----------|--|
| | | | | Content | Levels of response |
| 7 | | <p><i>Points to be made may include:</i></p> <p>Technological advances in white goods:</p> <ul style="list-style-type: none"> • Automatic washing machines/dishwashers/... • ...leading to increased free time... • ...increased leisure time/more family time/... • ...chance to go to work because of time freed up, leading to... • ...increased family wealth <p>Chance to work from home:</p> <ul style="list-style-type: none"> • More time spent in productive work • Chance to plan work around home life • Because of advances in communication and... • ...and availability of more accessible technology <p>More recent advances including:</p> <ul style="list-style-type: none"> • Intelligent larders which know what food is in them and place automatic orders... • ...delivered by supermarket and placed in larder from outside reduces the need for shopping • Robotic cleaners... • ...reducing the need for cleaning by hand • Microwave cookers have simplified the task of cooking together with... • ...large amounts of processed food available which does not need preparation | 8 | | <p>Mark band 6 – 8. Higher level response</p> <p>Candidate has described a number of areas in which computer technology has changed tasks needing to be done and the effects that these have had on the people concerned. Candidate has used appropriate technical terminology throughout. There are few, if any, spelling errors or errors of grammar.</p> <p>Mark band 3 – 5. Medium level response</p> <p>Candidate has described at least one area in which computer technology has changed tasks needing to be done and the effect that this has had on the people concerned. 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.</p> <p>Mark band 0 – 2. Low level response</p> <p>Candidate may have described an area in which computer technology has changed tasks needing to be done or has described the effect that an area of technology has had on the people concerned, or has failed to address either of the areas in the question.</p> |

| Question | | | Answer | Marks | Guidance | |
|----------|--|--|---|-------|----------|---|
| | | | | | Content | Levels of response |
| 7 | | | <ul style="list-style-type: none"> All have reduced the number of tasks to be done... ...the amount of time spent on those tasks which still need to be done ...the knowledge needed to complete the tasks The amount of socialising has been reduced eg when doing the shopping. | | | <p>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.</p> |

| Question | | | Answer | Marks | Guidance |
|----------|-----|------|--|-------|------------------|
| 8 | (a) | (i) | <ul style="list-style-type: none"> • Backup is making a copy of files... • ...so that if the file is corrupted there is a copy to return to/records of the fixture lists for this year • Archive is the file being removed from regular use... • ...can be used to free up space on the main storage/ while the data is still kept available if required/previous years' final league tables for reference | 4 | (1 per •, max 4) |
| 8 | (a) | (ii) | <ul style="list-style-type: none"> • Copy the file whenever a change is made to it/weekly... • ...to a secondary storage device/USB pen • Store the back-up copy away from the computer system • Keep more than one copy • Keep a record of any changes made • Distinguish between copies | 3 | (1 per •, max 3) |

| Question | | Answer | Marks | Guidance |
|----------|-----|---|-------|------------------------------------|
| 8 | (b) | <p><i>Answers may include the following:</i></p> <p><i>Input</i></p> <ul style="list-style-type: none"> • Braille keyboard/so that the secretary can feel the characters being typed • Microphone/so that the secretary can speak commands to the computer <p><i>Output</i></p> <ul style="list-style-type: none"> • Printer/to print letters to the different teams to give them fixture lists • Braille printer/so that the secretary can keep their own records • Speakers/so that the computer can use speech synthesis to relate what has been input back to the secretary <p><i>Storage</i></p> <ul style="list-style-type: none"> • Hard drive/to store the software and the user files • USB pen/to use to back up the files | 6 | (2 per •, max 1• per group, max 6) |

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