GCE

Computing

Advanced GCE **A2 H447**

Advanced Subsidiary GCE **AS H047**

OCR Report to Centres June 2014

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OCR REPORT TO CENTRES

F451 Computer Fundamentals

General comments:

The work of the candidates generally showed knowledge of the subject matter, there being very few candidates who were obviously unprepared for the rigours of the examination. However, the more technical questions (e.g. Q 5a) proved to be more of a challenge and there were few candidates who had the understanding necessary to successfully attempt them.

The presentation of work is generally very good although there are still some scripts that are very difficult to read. Candidates should be aware that they run the risk of not being given the credit that they otherwise would have if their script is illegible.

There was no evidence that candidates experienced specific issues with the duration of the exam, but their time management is generally poor.

Candidates are still tending to waste their energy on presenting extended and superfluous prose responses which do not answer the question. Whilst their ability of written communication is important, particularly on the extended writing questions, candidates should focus on answering the question set. Generally, examiners are interested in the understanding of the basic concepts that the candidate has and they should be encouraged to use whatever methods they find accessible to convey that understanding. Most candidates gave a prose style answer to Question 2d for example but failed to give enough detail to earn full credit. Those candidates who bulleted their response or who gave their response in the form of a set of numbered points tended to earn more marks for this question as it helped them structure their response.

Individual comments on specific questions:

1 a)   Most candidates scored well in this question. There were some interesting variations on the accepted version of 'local area network'. There were those who thought that the 'a' stood for 'access'. This sort of response was fine because the candidate had the correct concept and was able to go on and earn the marks, whereas candidates who stated that the 'l' stood for 'large' would then go on to describe the characteristics of a WAN and consequently did not gain marks.

   b)   This was well answered by the majority of candidates; the only confusion being that serial was treated as 'simplex'.

   c)   The intention of the question was to make candidates consider hardware choices in a simple scenario. The list of accepted answers is shown in the published mark scheme. Almost any device was accepted if the candidate could come up with a sensible reason for its use, although devices like floppy disk drives were not sensible devices for use by a finance manager in a firm. 'Magnetic tape' was a relatively popular response which was not accepted on the basis that it did not describe a device, but a 'magnetic tape drive' to store archive material was considered sensible.

2 a)   The question did state that a binary number was required, this means that the relatively common answer of using two 8-bit binary numbers that add up to 312 was not an answer to the question as set. It was odd to see so many responses that gave the 16 bit, 2's complement version of -312.

   b)   Many candidates adopted a scatter gun approach to this pair of questions, inserting the facts that they knew about character sets seemingly at random between the two parts.

Despite this most scored well here and some candidates gave clear and well-presented responses to both parts.

c) (i) Most candidates were able to indicate that the data was input twice, but then implied that the data was compared by the person doing the data input rather than making it clear that the comparison is done by the computer.

(ii) The data is entered into the computer so a presence check is not appropriate because the data has been entered. An existence check is not appropriate because the data being input is the price of the product to the database and so it will not exist on the computer already. Candidates who were able to give correct validation types were often unable to earn the second mark which required them to be able to explain how that validation rule would be applied to a price in a supermarket, not simply a generic description.

d) There were some comprehensive responses here, while many good answers were spoiled because the process described did not consider the need to avoid automatically ordering more tins after every tin is sold. Few were unable to earn some credit even if it was only for scanning the tins when sold. This proved to be an excellent discriminator question. This question was an ideal question to be answered as a series of numbered points, answering in this way could have helped some candidates arrange their thoughts in what is a sequential process.

3 This question was marked as a banded response question. Most candidates concentrated on the stages of the life cycle giving only a very cursory mention of the documentation required and often ignoring it completely. Many candidates either did not take note of the comment in the question about being after the design stage or did not understand the order of the stages properly. There was an element of use of the waterfall model in some responses which would entail returning to previous stages and this was considered a very thorough response, but candidates who filled their answer with a detailed description of the feasibility study did not attract credit.

4 a) Well answered except for those candidates who described devices rather than the process.

b) Some good answers but many simply rewrote the words in the question on the lines of 'An animation is when images are animated.' Responses needed to refer to the scenario to earn full marks. Nothing complicated was expected, for example 'moving images to show how a weather system develops' would earn two marks for (i). In (ii) it was important to indicate that the output from the software would be influenced by the input from the student even if it was only indicating whether answers to questions were correct or not.

5 a) This was a very technical question and was limited in its scope to the CIR, not to elements of the fetch execute cycle which is not on the specification for F451. If a candidate gave a wide reaching response, which many did, the points that were relevant to the CIR were picked out by examiners. As with question 2d, this is an ideal question to be answered using numbered points because the answer is a sequence of stages

b) Understanding of the purpose of the three bus types named in the specification continues to improve although there is still the desire among candidates to imbue them with rather more power than they have got. Typical is the desire to say that the bus 'stores' something rather than acting as a conduit. On a base level candidates can picture data being sent around the processor in the data bus and the details of where it

is being sent to are carried in the address bus. The control bus simply passes the control signals to the registers from the control unit.

6 a) Some candidates decided that this was a question about the Data Protection Act, otherwise it was well answered. Firewalls were often described as being able to block access from people rather than hardware.

   b) Most candidates were able to name the four parts of a knowledge based system but many stumbled on the description which needed to be related to the scenario of controlling traffic flows.

7 a) Another question which is ideal to be answered as numbered points. Some candidates confused circuit and packet switching but most earned two or three marks. The difficult point was that each time the packet arrived at a node another 'best route' needed to be found.

   b) This was well answered unless the candidate was confusing packet and circuit switching.

   c) The first part of the question was well answered, but checksums are less well understood. There were some very good answers that used the three example bytes, but many thought that if they added two of the bytes the answer would be the third byte and when it did not they surmised that the communication had failed.

8 a) This was well answered.

   b) This was a definition which many candidates did not know and answered as though it was a simple network.

   c) Most candidates are able to state two facilities offered by a NOS, but the descriptions are less well done.

F452 Programming Techniques and Logical Methods

General comments:

The answers provided by the candidates, on the whole, showed an understanding of the subject matter. Few candidates seemed ill prepared for the examination. However, some candidates found it difficult to use technical terms correctly, and did not use standard definitions where needed.

The presentation quality of their work was generally very good, but some scripts were still a challenge to read and decipher. Candidates should be aware that they run the risk of not being given the credit that they otherwise would have if their script is illegible.

One of the areas that candidates tended to slip up in was the use of upper and lowercase characters. In the questions the keywords in the pseudo code are always in uppercase and the identifiers are in a mixture of upper and lowercase (i.e. InterestRate). The candidates should be aware that in programming InterestRate and Interestrate are two different identifiers. Another problem that occurred was the incorrect ending of iteration and selection structure in pseudo code, for example ENDIF missing. This may be in part due to the candidates having learnt Python. The candidates should ensure that they answer questions in context, and include examples from the question to emphasise their point.

Individual comments on specific questions:

1 a) Most candidates gained full marks for this question. Those who did not either got RHOMBIC and PARALLELOGRAM the wrong way round or gave no response.

   b) i) On the whole this question was answered well. However some candidates did not make it clear that it could 'change during execution', but used phrases such as 'it is not fixed' etc.

   ii) Those candidates that did not achieve the mark used the wrong case.

   c) i) On the whole this was poorly answered with candidates not using the correct programming construct. The typical answer given was IF 88≥A≤92.

   ii) Most candidates only provided an answer for one boundary, usually (x-y), and did not attempt (y-x).

   d) i) On the whole this was answered well, and also in the context of the question.

   ii) It was not clear from the answers given by some candidates whether they were describing black or white box testing. Few mentioned the use of Dry Runs or Trace Tables.

   iii) This question was on the whole answered poorly. Few candidates took into account the tolerance of <10% when deciding the outcome, with a few candidates just repeating the example given.

2 a) Well answered by most candidates.

b) i) Well answered with reference to BODMAS/BIDMAS.

ii) The main reason given was that it made the code easier to read rather than the line. Only a few made the connection to the fact that the contents of the bracket calculated total interest.

2 c) Again, candidates dropped marks due to using the wrong case for InterestRate and/or including all or part of the line "CONST InterestRate=10". The candidates also needed to state clearly that a constant cannot be changed during the execution of the program.

d) Most candidates were able to gain marks for this question. However, a few basic errors caused them to drop marks. For instance not ending the loop correctly, and the interest/final values being calculated in the wrong order.

3 a) i) The wording used by some candidates did not make it clear that the parameter was passed to the subroutine. Words such as 'fed', 'allocated', 'put', etc. were used. Few mentioned that the parameter was used as a variable within the subroutine.

ii) Most candidates picked up full marks, but again the incorrect use of case caused a problem along with the continued idea that any digit string that starts with a zero can be held in an Integer.

b) A few candidates are still having problems differentiating between a function and a procedure.

c) On the whole this was answered poorly. The candidates either did not seem to understand that the value for a given character was different for uppercase and lowercase, or that it was the values which were compared and not the 'character'.

d) Quite a few candidates picked up full marks for this question. However some candidates did not answer in the context of the question, and therefore described range or presence checks.

e) This question was marked as a banded response question. The question asked candidates to evaluate the use of a random file and an indexed sequential file **in this situation**. This on the whole was poorly answered, as most candidates explained either out of context/ gave basic definition (middle level response) or concentrated purely on one or the other file types (low level response). It was also worrying how many candidates gave a serial file description for the random file.

f) i) Nearly all candidates gained full marks.

ii) Some candidates used the string functions either "left" or "mid". The "left" string function worked for the first time through the loop but not for any subsequent iteration. The "mid" string function, with correct parameters, worked for all iterations. However, the simple string index was used successfully by most candidates. Only a few candidates concatenated the characters into the result for output, with most outputting a character at a time.

4 a) Very few candidates got the full six marks, with most picking up marks for the dropdown buttons and ensuring valid input of colours. The question was asking about how the interface design helped to make the program effective and not how visually attractive it was. Examiners were not looking for phrase like 'nicely laid out', 'effective use of space', or 'had a calculate button'.

b) On the whole most candidates got this correct. Those who did not gain the mark either wrote out the IF statement example or just put IF.

c) i) Examiners were looking for a response which confirmed that the candidates knew statement line(s) had extra spaces at the front.

ii) Most candidates were able to explain the concept of seeing where the blocks started and ended, but most did not contextualise the concept by including an example from the question.

d) i) The candidates did well on this question. Those who did not gain the mark tended to shorten the actual output to '10%'.

ii) On the whole this was well answered, but some candidates threw away a mark by not correctly indenting.

e) Candidates struggled with this question. It is a high level question in that examiners expected the candidates to know that ASCII has a limited number of characters, and that to get characters such as Ω they would either have to use Unicode or a version of extended ASCII. We also wanted them to demonstrate that programming languages have access to character functions.

f) Most candidates picked up one mark for "makes the code more readable", but did not expand this point to say IF statements would have many levels of nesting.

g) i) The candidates answered this well, with exceptions who said in various ways that it was a programming error.

ii) This question was answered well. Those who did not get the mark typically did not attempt the question.

iii) This question was answered well.

h) A few students produced excellent working solutions to this question using different approaches. However, some candidates did not use the FUNCTION ValueOf to calculate the number of zeros, which resulted in them struggling to append the correct number of zeros to the output string, as well as appending Ω or kΩ

F453 Advanced Computing Theory

It seemed that there was a wider range of responses this year with some candidates doing extremely well and others struggling with some of the most basic concepts. A small but significant number of candidates still either misread questions or fail to answer in context. Centres should be impressing on candidates the need to contextualise their responses. On the plus side there is a marked improvement in the responses to questions about Class diagrams and also the declarative language.

1 a) i)   This question seemed to baffle a lot of candidates who decided to answer a question about priorities instead. Those who answered the question properly generally managed to get one mark, there were relatively few who got full marks for this.

   ii) This question was well answered by most candidates with "round robin" being the clear favourite response.

   iii) In general, this was well answered with the whole range of expected responses from the mark scheme being used.

   b)   Most candidates gave correct responses to this, with the majority of those gaining two marks, the most popular answers for this were 'allocates memory' and 'protect programs from each other'.

   c)   A lot of candidates had problems with this question and a significant few thought that this was concerning saving to secondary memory. Very few mentioned "partitioning" and it was thought that this should be fairly standard when referring to paging.

2 a)   This was the first of two banded response questions. In general candidates showed a good level of competence, however, a few diverged into talking about interpreters and error checking which was not what was required.

   b)   Excellently answered, very few candidates had any problem with this question and most candidates gained at least two out of the three marks.

3 a) i)   A very well answered question, with only one possible answer.

   ii) Again generally well answered, although a small percentage of candidates were seemingly unaware that you could put more than one tick per row. Doing practice questions should have got them used to this, candidates should be reminded to read question stems thoroughly.

   b) i)   There were a wide variety of answers to this question, ranging from the very accurate to the very vague. A significant number of candidates said that RISC is used in mobile phones, if the question had asked for an example this would probably have been a good one. Those that missed marks here generally talked about the programming and its relative difficulty on either type of processor rather than the processor itself.

   ii) Most candidates got the first mark, the more able candidates managed to get the second, again, here the most common erroneous answer was about the merits/drawbacks of programming.

   c) i)   Both this and the next question were well answered by candidates who knew that a co-processor is for floating point calculations.

ii) For this part there was a wide variety of inventions as to how a co-processor could control a print queue, not answered well by those who did not grasp the first part of the question.

4 a) i) As expected most candidates (using the usual different methods of completing the task) correctly answered the question.

ii) Candidates on the whole correctly answered the question.

b) i) Most of the candidates were able to correctly identify the proper answer and the reason for it.

ii) For some reason this question was not as well answered as anticipated, perhaps it was because of the slight change in direction from the previous questions.

5 a) i) – iv) These four questions were marked as a group. These questions were good differentiators and allowed for a clear distinction between candidates. The more able got four marks the majority managed two marks.

b) i) This was one of the questions that required an answer in context and many students did poorly as a result of not contextualising their response. Centres should emphasise to candidates that they need to think about the context of their answer if the question stem requires it.

ii) This question also suffered from candidates either not reading the question properly or not contextualising their response.

iii) In the main a well answered question, any candidates who did not gain marks for this probably lost them for being too vague in their answer; this was an easy question but required a full answer to justify the mark.

iv) Well answered by most candidates who obtained one mark with the more able candidates getting the second mark.

6 a) i) An easy question which most correctly answered. There was only one possible answer.

ii) This was also well answered, there were two possible answers, both equally correct.

iii) This question asked for examples and was one of the few questions where just about every candidate managed to give an example.

iv) This was a stretch and challenge type question and the expected target candidates were able to answer correctly.

v) Most candidates were able to pick up at least two of the three marks for this, showing a good understanding of class diagrams.

b) i) – iii) These three questions were marked as a group and the responses were well below the expected level of response. Centres should be aware that there is a document published on the OCR website that says exactly what UML diagrams we will use and the standard format that they will take, including any naming conventions that apply.

7 a) i) A mixed bag of answers for this question, a good example of candidates not reading the question. About half gave a perfect answer and the other half said something about using procedures and functions or that it used sequence, selection and iteration which was not what was required.

ii) Most candidates were able to give a complete answer to this question and it was good to see candidates talking about scope of the variables.

iii) Some candidates knew this and were able to reel off the answers easily, some managed to get half way and gave vague answers on the detail and some missed the point entirely. This question was designed to cover a range of grades and this was demonstrated in the range of answers given.

b) i) Well answered and it was pleasing to see that some candidates used binary trees to show their working.

ii) Of those that answered this correctly a significant proportion drew stack diagrams and worked it out from that, candidates that used this method did significantly better than those who didn't.

8 a) Not a well answered question. Candidates seemed more concerned with the washing machine and its functions rather than the processor controlling it, a clear division was shown with those showing higher ability more likely to get full marks on this question.

b) Most candidates were able to get some marks on this although disturbingly there was a large proportion of candidates who put the last tick in the empty cell, presumably because it didn't have anything in it yet.

c) Another question that was expected to differentiate between candidates. Those of higher ability generally managed to get three or four marks on this question, most candidates could get one or two marks by addressing modes but the difference was in the ability to describe what it did.

9 a) The second of the banded response questions, this question was good at differentiating, those who tended towards the lower end of the marking scale did tend to be very repetitious.

b) i) A standard question that almost every candidate got right with only one possible answer.

ii) This was very well answered and most students managed at least two marks, those that did not achieve the full three marks generally did not give a complete enough description for the first two marks in the mark scheme.

10 a) Most could name the type of language as there was only one possible answer.

b) Most candidates achieved this mark.

c) Those candidates that did not gain the full two marks here did so because their answers were either too vague or lacked an example.

d) Another question that was set for the higher ability candidates and results on this were as expected with only a few candidates getting the full two marks on this.

e) Mostly well answered by those who knew what the program was meant to achieve, a few wild guesses from candidates otherwise.

F454 Computing Project

General Comments:

There was an increase in the number of candidates submitting work this year with a number of new centres.

The best work was from those candidates who had consulted with a potential end user to define the requirements and to develop the designs. The ability to 'bounce' ideas backwards and forwards focuses the student on what makes a good solution. Research into existing solutions to the same or similar problems is invaluable and it is rare to find all the information required from a single source, often through interview or from the student's own experiences. While the analyses were better this year, this section remains one of the most obvious weaknesses in many projects.

Games are fast becoming the most popular choice of program, often through familiarity with the concept, but there were some interesting choices of project with some excellent work developing simulators for practical aspects of science courses in evidence.

Data base projects are still a valid option but do require some real end user input to work well. It is important these are coded options and the small number of 'ACCESS' with a bit of coding projects submitted were not appropriate and did not score well. These "ACCESS' plus VBA projects were often quite trivial and did not provide the range of coded features necessary. Data bases created in ACCESS are not credited under many of the assessment sections and it is the VB code that is generated and connected to the database that will score.

Designs are generally as good as the research that preceded them and there were still a small number of superficial designs with algorithms that did not define a working solution. The design should contain sufficient detail for the work to be handed over to another person to complete without further need for analysis and design work. Many, however, produced excellent, detailed and thoroughly tested algorithms with appropriate test strategies that were implemented during development.

Lack of evidence in development of the iterative process was a major cause for marks being limited by the centre or through moderation. Just submitting the code and a few paragraphs about the development is not enough, we must see evidence of testing and, if necessary, refinement at every stage of the development process.