AS
Computer Science
Paper 2
Report on the Examination

7516/2
2018

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Questions 1.1 and 1.2
The majority of students answered these question parts correctly, identifying the appropriate sets.

Question 2.1
Many students demonstrated sound understanding of units to the power of 2 and the power of 10. Where this understanding was not evident there was no significant difference seen between students getting either mark point 1 or mark point 2.

Question 2.2
It's pleasing to see that the majority of students have mastered binary addition and hexadecimal conversion. Where students were not successful in gaining full marks, it was normally because they had incorrectly converted – often due to minor errors. Some students converted the hexadecimal number '27' as if it was a decimal integer. This led to the loss of the conversion mark.

Question 2.3
A large number of students got this question correct. Of those who didn't, most forgot the negative sign, calculated an extra digit, or made both errors.

Question 3.1
A reasonable number of students gained full marks on this question; this was facilitated by using the keywords "continuous" and "discrete". Where these keywords were not used, students had to try and explain the terms which, sometimes, led to confusion and to students not gaining all the marks as full understanding was not evident.

Question 3.2
Few students were able to achieve top marks on this question part. A significant number of students demonstrated a lack of understanding as to what MIDI was, often suggesting that MIDI used better sampling than sampled sound or can be played on any device. Most commonly students were able to identify that MIDI files may be smaller than sampled sound files, and that individual elements of the file can be edited.

Question 4.1
Although a lot of students gained a mark in this question, there were significant numbers who did not. Often this was through lack of clarity – the word "scrambling" without any further explanation was frequently seen. Another commonly seen response that was not worthy of a mark was the idea of hiding or removing access to data. Students needed to make clear that the process consists of more than, for example, applying a password. The best answers made use of the words "plaintext" and "ciphertext". For future reference, it is worth noting that encryption and encoding are not the same process and coding/encoding were only awarded marks if further clarification was offered. Similarly, "access" is not the same as understand or read and was not allowed without further clarification.

Question 4.2
Many students were able to gain a mark by identifying that the Vernam cipher is more secure than a Caesar cipher. However, many attempted to gain the second mark by saying this was because the Vernam cipher uses a one-time pad; this was not sufficient. A significant number of students just explained what a Vernam cipher is and did not apply this knowledge to the question posed.

Question 4.3
Whilst a reasonable number of students were able to identify the correct binary representation for HOG, and some number were able to apply a correct XOR between it and the binary representation of SON, a frequently seen error was that students tried to AND the two bit patterns

together. In some cases, this cost both the second and third marks where the student was left with a bit pattern of more than 21 bits.

Question 5.1
The vast majority of students gained the mark in this question part for correctly identifying that an operating system was system software.

Questions 5.2 and 5.3
Most students that gained a mark on question part 5.2 identified that the Operating System manages memory. However, in both parts students demonstrated a lack of understanding of the term “resource management.”

Question 6.1
A large number of students were unable to differentiate between the stored program concept and the Harvard Architecture model.

Question 6.2
Few students were able to achieve full marks on this question part. Whilst a reasonable number were able to identify that the two processors might have different instruction sets, fewer were able to expand on this to identify that the compiled program would be unable to utilise these different instruction sets.

Question 6.3
Where marks were awarded on this question part, it was most commonly for identifying what is meant by different clock speeds, although students frequently just said that Josephine’s computer had “more GHz than Ella’s” which did not demonstrate sufficient understanding for a mark. It was far rarer for students to identify that programs had to be specifically designed to utilise multiple cores. Again, vague answers were common but insufficient to be awarded mark points.

Question 7.1
The most common mark points awarded were for identifying the ethical issue of having to choose between lives, and the assignation of blame when a life is taken. Better answers made a strong point and moved on to other issues, whilst some students spent significant periods of time expanding and explaining one point and often missed the opportunity to gain more marks. There was very little evidence of students planning an answer to the question before writing it.

Question 7.2
The workings of a digital camera were generally well known, with many students receiving 3 or 4 marks. Run length encoding is also well understood, but frequently a lack of clarity is demonstrated with students referring to patterns of data or the same data in a row. Neither of these was specific enough to be awarded a mark.

Question 8.1
Students struggled to identify the difference between physical and logical topologies. Unsurprisingly where a single mark point was awarded this was for the easier-to-grasp concept of a physical topology, although many students referred to the general setup of a network rather than referring to the physical wiring and connections.

Question 8.2
Many students understood the general idea of a star topology. However, it was frequently been stated that the central node is a server. This is not correct and precluded access to some other mark points. Strong students identified the central node as a switch, hub or router and that data is

transmitted via the central node. Where mentioned, students were generally correct in stating that switches transmitted data only to the intended recipient and/or hubs broadcast to all potential recipients.

Question 8.3
Although the majority of students were able to achieve marks on this question part, it was most frequently just 1 or 2 marks with very few students achieving more marks than this (the maximum was 6 marks). While most students did manage to refer to the scenario posed, many were obviously confused between a client-server network and a physical mesh topology.

Question 9.1
The majority of students got the mark point on this question part for correctly identifying the XOR gate from its symbol.

Question 9.2
The majority of students got the mark point on this question part by correctly completing the truth table for the NAND gate.

Question 9.3
The most frequent loss of marks on this question part was for linking both NOT A and NOT B with an OR gate. This demonstrated that a large number of students do not appear to be aware of the order of precedence between AND and OR.

Question 9.4
Most commonly students did not know the identity between $\overline{A} \cdot B + \overline{B} \cdot A$ and $A \oplus B$. Prior to this stage of the calculation, the most common error was students misapplying De Morgan's Law. This led to an incorrect algebraic statement which led to students being unable to access later mark points.

Question 10.1
There were a good number of strong answers this year, with far less obviously incorrect assembly code being used. The ADD and SUB commands were more often correct than the branch commands but where students identified that two branches were needed they were frequently implemented correctly.

Question 10.2
Whilst many students were able to answer this question part correctly, there were a lot who did not understand that the addressing mode is part of the opcode and therefore answered with 32. Where this understanding was not shown, there was a fair range of "common" binary numbers used (16, 128, etc.) suggesting students were trying to guess the answer.

Question 10.3
Many students were correct in answering 1024 for this question. The most common error was to subtract 1 from the final answer.

Question 11.1
Although many students were aware of the need for portability, this often wasn't expressed in sufficient detail to be awarded a mark. There were a number of responses where the students talked themselves out of marks by not being clear about the difference between object code, source code, and byte code.

Question 11.2
A relatively large number of students did not attempt this question part. Identifying that a virtual machine is used was the most common mark point awarded. Where students attempted to describe the process – via just-in-time compilation or via interpretation – many failed to differentiate successfully between the process involving bytecode and the process involving high level source code.

Question 11.3
Unfortunately, it is clear that many students do not understand the term “imperative high-level language”, despite similar questions being asked in previous examinations. Students often attempted to explain the meaning of a high-level language without referencing the concept of being imperative. A large number of students answered with points from the mark scheme that were considered insufficient, often referencing closeness to English language.

Question 12.1
Whilst many students answered this question correctly, there were more mistakes than expected. Although calculating the number of pixels was often done correctly, as was converting from bits to bytes, students frequently failed to correctly identify the colour depth and some of the comments made by students alongside the working suggests this was a result of lack of understanding rather than simple mistakes being made.

Question 12.2
A reasonable proportion of students achieved this mark point, correctly identifying the required colour depth.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator