AQA

AS LEVEL
COMPUTER SCIENCE

7516/2 Paper 2
Report on the Examination

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Question 1.1 and 1.2

Most students correctly identified the values from the multiple-choice answers.

Question 1.3

Only two-thirds of students got the mark for this question. The most common answer was that real numbers included all rational and irrational numbers.

Question 1.4

Over three-quarters of students correctly identified $\mathbb{N}$ (the symbol for the natural numbers) as the most suitable set. The most common incorrect answer was $\mathbb{Z}$ (the symbol for integers): the set of integers includes negative numbers so is not suitable for counting.

Question 1.5

This question was badly answered with only half the students gaining the mark for describing ordinal numbers and almost 8% of students not attempting this question. Incorrect answers gave vague descriptions relating to position, but failed to state that this was where an object/entity placed in the order/sequence.

Question 2.1, 2.2 and 3.1

Over three-quarters of students correctly answered these questions which have appeared in different forms on earlier examination papers.

Question 3.2

Despite the question highlighting the importance of completing the carry row, some students did not do this and so lost the mark (even if they correctly added the two binary numbers). This was necessary to show that students can do the addition manually without using a calculator.

Question 3.3

It was pleasing to see many students attempting subtraction by performing two's complement on 00100100 (36) and adding it to 00011011 (27). However, only half the students managed to score at least one mark. Common incorrect methods included making 27 negative (-27 + 36) or making both numbers negative before adding them together.

Question 3.4

Over half the students correctly identified the lowest and highest values possible with 8-bit two's complement. The most common incorrect answer was -256 and 255 due to students not reading the question carefully to see that, as this is a two's complement number, the leftmost bit represents a weighting of -128.

Question 3.5

Over three-quarters of pupils gained at least one of the two marks for this question converting fixed point binary to decimal. The most common incorrect answers were 221 (ignoring any fixed point) or 55.25 (incorrectly placing two bits after the binary point, instead of before).

Question 4.1

Too many students were vague with their responses about majority voting, often simply stating "more bits mean it is more accurate" which is not markworthy.

Question 4.2

Almost three-quarters of students gained at least one mark in this question, with the most common response being that data can be transmitted more quickly using parity bit rather than majority voting. Very few students managed to get both marks with the most common incorrect answer attempting to discuss errors in either system.

Question 4.3

This question was answered well with over 85% of students correctly circling the byte of data that had been received incorrectly using odd parity.

Question 5.1

Over three-quarters of the students correctly described how to calculate the minimum storage requirements of a bitmapped image. The most common incorrect response was students using the number of colours instead of the colour/bit depth.

Question 5.2

Over two-thirds of students could recall the definition for sampling rate, others giving incorrect and vague responses such as "How often samples are taken".

Question 5.3

Half the students failed to define sampling resolution. Many of the incorrect answers gave vague responses about "quality of the sound". Some students incorrectly discussed the "number of pixels" having missed the question stem about representing sound digitally using sampling.

Question 5.4

Almost two-thirds of students gained full marks for describing a problem using lossy compression on sound and how the compression has caused the problem. The most common correct response was about the quality of the reproduced sound not being as good as the original sampled sound.

Question 5.5

Only a third of students gained full marks for stating two advantages of MIDI. The most common correct responses concerned MIDI being more compact and it being easier to modify/edit notes/instruments. Many of the incorrect answers gave vague responses about MIDI being "better quality". Over 25% of students gained zero marks or failed to attempt this question.

Question 6.1

This question was about libraries and only half of students achieved both marks. The most common incorrect answer defined libraries as being used to “store data”. Some students gave vague responses for the reasons for libraries, such as “easier/simpler to organise code” perhaps confusing libraries with subroutines. Over 25% of students gained zero marks or failed to attempt this question.

Question 6.2

Over three-quarters of students gained at least half marks on this question.

Some of the better responses clearly outlined the programming features and structures that are available in high-level languages that are not available in low-level languages. Level 1 responses often included vague statements such as “high-level languages are user-friendly” or “low-level languages are close to the computer’s hardware” which do not show a clear understanding.

Question 7.1

This truth table question was well answered with over three-quarters of students gaining full marks. Some students incorrectly completed the L column (A XOR B) with the most common incorrect response being for A NOR B. However, these students often went on to complete the N and Y columns correctly, as they were not dependent on the output from the XOR gate (column L).

Question 7.2

Students were asked to write a Boolean expression for part of the logic circuit diagram (output Y). This was well answered with 60% of students scored both marks, although over 7% did not attempt the question.

It is worth noting that this year we accepted responses written using AND, OR and XOR, but in future it is expected that students will write Boolean expressions with the syntax used in AQA examination papers: · (AND), + (OR), $\oplus$ (XOR) and overbar (NOT).

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Question 7.3

Simplifying Boolean expressions has been assessed on previous papers and almost half the students scored full marks. A lot of students were able to gain a few marks before making a mistake in precedence when simplifying the step $A \cdot B + B \cdot \overline{A}$ incorrectly taking the B+B to B.

Question 8.1

This question about the status register has not been asked much before and more than half the students scored zero marks or did not attempt the question. Almost one-third of students managed to gain one mark, most commonly for giving an example of a circumstance where the status register contents would be updated.

Question 8.2

Over 85% of students could name another physical resource that the operating system manages. The incorrect answers included naming the processor (given in the question) or not naming a physical resource.

Question 8.3

Almost three-quarters of students achieved at least one mark in this question about executable machine code and processor instruction sets. A common misconception was discussing “file compatibility” problems or discussing encryption (perhaps due to the names Alice and Bob in the question).

Question 9

Previous exam papers have included a question on writing an assembly language program so students should have been prepared. This question was straightforward with only one loop, so almost half the students gained at least three of the four marks.

Some responses met all the four programming marks available in the mark scheme but were capped at three marks as the program did not work in all circumstances. This was usually due to the student failing to put the start of loop label before a CMP (corresponding to the test in the WHILE B > 0 statement), and instead putting it before the ADD (corresponding to the start of the code inside the WHILE statement, ie C □ C + A).

Question 10

Over 65% of students gained zero marks for this question or did not attempt it. Most students simply gave generic factors that increase the performance of the smartwatch or vague statements about the benefits of increasing clock speed. Students should make sure to answer within the context of the question.

Question 11

This extended answer question was about an application that allows users to upload a photo to receive an AI generated image of themselves in recommended clothing. There were two parts to the question, how a digital camera works and moral, ethical, legal and cultural issues the developers of the application might have to consider. It was well answered with more than half of students gaining at least five out of the available nine marks. Some of the better responses included discussions on how the application might impact different cultures or subsections of society. For example, discussing unconscious bias in AI or cultural assumptions or appropriation based on skin colour.

Some students gave very full responses about the impact of the application but failed to show a very good understanding of how an image is captured and so were capped at a level 2 response. Some of the better responses included that each sensor produces an electrical signal which is then converted to binary.

Question 12.1

This question was about SSID and over half of students gained full marks. A common misconception was that the SSID was the name of the wireless access point, rather than the network.

Question 12.2

This question was about the security protocol WPA2 and was not answered well, with over half of the students scoring zero marks or not attempting it. The most common incorrect answer was that WPA2 involved giving a password to join the network, with many missing that it was for encrypting data.

Question 12.3

Over half the students scored half marks on this question about why it would be inappropriate for a coffee shop to use MAC address filtering. The most common correct response was that it would be time-consuming for staff to manually do this. Most responses contained vague statements showing that students did not have a strong enough understanding of MAC address filtering to be able to apply their knowledge to this scenario.

Question 13.1

For this question students had to explain how a physical star topology operates. The most common correct response was that each device was connected to a central switch, although far too many students are still incorrectly calling this a server. The mark scheme accepted hub as an alternative for switch but this is out of date as modern networks almost always use switches.

Question 13.2

Almost half of the students scored zero marks or did not attempt this question about how a client-server network operates. Students must demonstrate a clear understanding that a client requests services from the server and then the server responds.

Question 14

For this question students needed to give characteristics of RFID technology and explain why these make RFID suitable for securing the room. Some students could recall the characteristics of RFID but were not able to relate them to the scenario given in the question. Too many responses lacked depth instead making generic statements such as “RFID is portable”.

Mark Ranges and Award of Grades.

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