Level 3 Technical Level

IT: CYBER SECURITY
IT: NETWORKING
IT: PROGRAMMING
IT: USER SUPPORT

Unit 5 Mathematics for programmers

Y/507/6469

Report on the Examination

6469
January 2018

Version: 1.0

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General Comments

A number of candidates did not appear to have a scientific calculator in the examination so may have found the time constraints of the paper difficult. While it is good practice to be able to do calculations such as base conversions on paper (indeed recognition of this process was essential for Q10) all specifications in the suite permit a scientific calculator to be used in the examination and the papers are written with the expectation that candidates will utilise this facility.

The multiple-choice questions scored very highly overall, although some learners struggled with Q2 and another with Q5. Candidates were less secure on binary signing techniques, with some converting to a decimal in Q6.2 and in Q7.1, although there was some recognition that the leading 1 indicated a minus number few were able to find the decimal equivalent (giving -7 as the answer instead of -121). Some candidates interpreted 'decimal number' in Q7.2 as 'the digits after a decimal point'.

Common errors in Q8 were to read the bits from 0 to 15 rather than 15 to 0 (shown with a diagram in the question paper), or to reverse bit 4 and bit 5 from the table and give the fault, incorrectly, as 'Memory error'. However, candidates generally recognised the conversion needed from hexadecimal to binary and the correct bit pattern.

Candidates were able to fill out the truth table in Q9.1 for the even parity logic but felt less secure in writing out the equation, some giving the logical operator but not writing out the equation in full (eg omitting R =). Similarly, for Q10 candidates correctly identified the bit pattern required but not the logical operation needed.

Candidates struggled with the elements of pure maths.

The understanding of probability was mixed for Q11. Most candidates correctly completed the probability tree diagram and most were able to pick up 1 mark for Q11.2 without necessarily being able to find the final result. The mark scheme gave one example of the process involved; candidates came up with others which were credited and around a quarter of all candidates achieved the full 3 marks.

Most candidates who attempted to simplify the algebraic expression in Q12.1 did not know how to cross-cancel, which made the combination of like terms much more difficult and usually resulted in an error being made. Some candidates solved the equation in Q12.2 but only gave one value for x in their answer, limiting themselves to 1 mark. The next section of the specification page 100 ('functions') was covered in Q14 slightly better – though not much – than algebra. Some candidates who identified the graph correctly may have guessed as they were unable to explain their reasoning. Candidates who understood the process of substitution in Q14.4 but came up with an incorrect answer, usually evaluated $4x+1^2$ instead of $4(x+1)^2$.

The rules of matrices were not well understood in Q15 or Q18.2 (see specification page 101). For the latter, many candidates solved the simultaneous equation (for 3 marks) but only a handful even attempted to use the matrix method (worth 4 marks). The specification states: 'Common practical application of matrices, eg: solving simultaneous equations."

Candidates did well with sequence and series in Q16 though were not always able to explain the difference clearly. Finding the n^{th} term caused most difficultly.

Venn diagrams were much better understood. A few candidates overlooked the stem of the question, where the total of 100 computers is given. Most found the values for the intersection and gained marks for this, even if drawing a diagram which represented more than 100 computers.

For Q17, as with Q9, most candidates were able to complete the truth table (and the Karnaugh map in Q17.3) but found it harder to write down the logic equation. Candidates who did not complete the truth table correctly were given credit if they understood how to fill in the K-map (even if with the wrong data) and could potentially have answered Q17.7, though some had given up by this stage. For candidates around the pass mark, the loss of marks from not getting the truth table correct was sometimes disproportionate and the pass mark of 31 reflected that. However, for those candidates who did not reach the pass mark, it was invariably down to a lack of knowledge of key areas of the specification such as matrices which are clearly listed in the Unit Content.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

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 *(delete if appropriate)*

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