Version : 1.0: 0708

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics (Modular) 4302

Specification B

Module 5 Paper 2 Higher Tier 43005/2H

Report on the Examination

2008 examination - June series

Further copies of this Report are available to download from the AQA Website: www.aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334). Registered address: AQA, Devas Street, Manchester M15 6EX
Dr Michael Cresswell Director General.

General

Most candidates were able to demonstrate their skills and knowledge throughout the first twelve questions on this paper. They usually attempted the later questions, showing that time was not a problem for them, but with less success.

Answers were usually set out clearly but in trigonometry questions a random scatter of working did not always show logical progression through the problem. Algebraic manipulation was again a problem for a significant number of candidates. Significant numbers of candidates lost marks by failing to state units or for giving the answer to an appropriate degree of accuracy when required.

Topics that were done well included:

- linear equations
- transformations
- number grids
- straight line graph
- volume of a cuboid
- construction of a perpendicular bisector.

Topics which candidates found difficult included:

- algebraic indices
- algebraic factorisation
- application of the sine rule
- solving a fractional equation
- vector geometry.

Question 1

This question was answered well by many candidates but some used the side *BC* rather than base and height. Some made the question more difficult by finding the length of *DC*, then *AD*, in order to calculate the area of the two triangles and add them together.

Question 2

Part (a) was mostly answered well but a number of candidates arrived at $2x = 11$ and then failed to give $5\frac{1}{2}$ as the answer. Those who multiplied by 3 in part (b) were usually more successful than those who tried to divide the left-hand side by 3. A common error was to multiply $13 - 5y$ by 3 and write $39 - 15y = 12$.

Question 3

This question was usually well answered.

Question 4

Parts (a) and (b) were done well but in part (c) some candidates omitted n and made the total $3n + 27$ and others produced $n^4 + 27$. Proofs for part (d) were generally weak and lacking in clear explanation. Those who used $4n + 27$ needed to state that a multiple of 4 is always even and that adding an odd number (27) to an even number produces an odd number. If they referred back to the elements in the table, both the case with 3 odds and 1 even and the case with 1 odd and 3 evens had to be considered. The notation below shows the steps required.

(O + O) + (O + E) = E + O = O   (O + E) + (E + E) = O + E = O

Question 5

There was much confusion between interior and exterior angles of regular polygons, despite the diagrams which should have helped candidates to distinguish between obtuse and acute angles. Many of those who worked out 360 ÷ 8 and 360 ÷ 5 thought they had found interior angles so proceeded to subtract (45 + 72) from 360. Those who tried to use the formula for the sum of the interior angles were seldom successful.

Question 6

Many candidates lacked a clear strategy for changing the subject of the formula. Those who showed that $5d = c – 2$ often failed to show that the whole of the expression $c – 2$ then had to be divided by 5.

Question 7

Many correct graphs were seen but some candidates failed to read the question carefully and did not draw the line all the way from (–1, –7) to (5, 5). A sizeable number of candidates failed to recognise that the point of intersection of the two graphs gave the solution to the simultaneous equations, but many answered this part well.

Question 8

Many candidates did not use the formula for the volume of a prism, despite it being given on the formula sheet, but preferred to find the volumes of the cuboids and add them together. The question was generally answered well but too many candidates lost the fifth mark because they failed to state the units.

Question 9

Most candidates gained 2 marks in part (a). The construction arcs should cross clearly, not touch, or overlap only marginally as was seen in some answers. Only a minority were able to describe the locus accurately - many tried to describe the line and not the points.

Question 10

Part (a) was usually answered correctly but in part (b), dealing with the indices sometimes left candidates confused as to what they were doing with the integers. There was less success with part (c) where many candidates would have helped themselves if they had started by writing out the cube as $2p^3r^2 \times 2p^3r^2 \times 2p^3r^2$. Marks were lost by leaving multiplication signs in the answers.

Question 11

In part (a), many candidates tried to use the sine or cosine rules and were unsuccessful. Those who used the tangent seldom wrote out the equation tan *A* = $\frac{11}{16}$ to show their method clearly. Others found the hypotenuse first, having failed to assess what could be done with the given lengths. In part (b), failure to read the question carefully resulted in several candidates finding the length of *DE* rather than *DF* and many answers were not given to an appropriate degree of accuracy.

Question 12

There were many correct answers here, but also some evidence of confusion because the question had not been read with sufficient care, with both sides increased by 20% or the same length used for both increases.

Question 13

Many candidates did not understand what was required in this question. In part (a), some candidates thought they had to solve a quadratic equation, but were given credit if they found the correct brackets. Only a few were able to progress beyond 3($y^2 - 4z^2$) for part (b).

Question 14

Some candidates recognised that they should apply the sine rule to this triangle but could not set up a correct equation. Premature approximation spoiled some promising solutions.

Question 15

There was very little understanding of vector geometry or of the meaning of proof. Many candidates simply asserted that, for example, *OM* and *AC* were parallel, without any evidence. Those who worked with vectors often proved that vector *OA* = vector *MC* or, with greater complexity, that vector *OM* = vector *AC*, but used this only to show that opposite sides were equal. Once they had found one pair of equal vectors, they had sufficient evidence for one pair of sides being both equal and parallel and hence that *OACM* was a parallelogram.

Question 16

Many candidates did not start by writing down: $\frac{1}{3}\pi r^2$ 28 = 2400, which would have given them the first step towards finding the value of r. Those who were successful often moved to: πr^2 28 = 2400 × 3 as their next step, which removed the likely mistake in dividing by $\frac{1}{3}$ which was often the downfall of otherwise competent answers. Similarly, working out $\frac{1}{3}\pi 28$ = 29.32… and then dividing this into 2400, was a good method.

Question 17

This last question required algebraic skills which eluded many candidates. Credit was given to candidates who obtained $4(x-2) + 3x$ but many then either failed to equate this with $x(x-2)$ or failed to multiply out $x(x-2)$ correctly.