Version

**General Certificate of Education (A-level)
June 2011**

Mathematics   **MM05**

(Specification 6360)

Mechanics 5

Report on the Examination

General

The standard of work for this paper was usually excellent, with candidates largely showing sound knowledge of the specification and of the application of the principles of mechanics. Use of mathematical techniques such as integration and trigonometrical identities was impressive, and algebraic manipulation was excellent. The only weakness was seen in question 6, where candidates were mostly unable to apply the principles of polar coordinates in a mechanical context.

Question 1

This was a popular question yielding full marks in most cases. Standards of accuracy were very high, an improvement on recent years.

Question 2

This was another popular question, showing sound knowledge of techniques relevant to the topic. Both parts were done very well, with only occasional misquotation of formulae or algebraic errors marring solutions.

Question 3

Candidates were able to attempt all parts of this question, but part (a) proved more challenging than expected, with some seeming unsure as to the requirements for simple harmonic motion. Part (b)(i) was done very well, as was part (b)(ii), although there were a number of errors in accuracy here. Part (b)(iii) proved very challenging; many successfully quoted the nature of the roots of the auxiliary equation as justification for heavy damping, but the hint of using a sketch was not appreciated.

Question 4

This proved to be a highly popular and successful question. The standards of differentiation and trigonometrical manipulation were very high. Part (a) was done well, with excellent use of trigonometry. Parts (b) and (c) were also done well, with a higher standard of accuracy than in some recent years, and only a very few not working in radians.

Question 5

This question revealed a much improved understanding of the principle of variable mass. Most candidates made a sound attempt at part (a), with sign errors relating to the relative velocity of the module being the most likely lapse. Part (b) was also done well, with occasional lack of understanding of the variable mass in part (b)(i) and inaccuracy in the use of limits of evaluation of the constant of integration in part (b)(ii). Part (c) was completed well.

Question 6

This question was the only poorly answered question of the paper, with the application of mechanical principles in this context seemingly beyond most. A surprising number of candidates could not answer part (a)(i) correctly, through not appreciating the horizontal direction of the tension, and, when including the weight of the particle, overlooking the reaction from the table. Most attempted part (b) but few were able to explain the acceleration in connection with r. Only a small minority considered the motion of P when attempting part (c), and the use of the zero value of the transverse acceleration of P was rare in attempts in part (d). Necessary conditions for a response in part (e) were not referred to and this completed a poor response to the question for most candidates.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results statistics page of the AQA Website. UMS conversion calculator www.aqa.org.uk/umsconversion