



**General Certificate of Education**

**Mathematics 6360**

**MM1A      Mechanics 1A**

**Report on the Examination**

*2008 examination - June series*

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## Written Component

### General

Most candidates found the paper accessible and were able to make good attempts at a number of the questions. The weaker candidates were able to produce reasonable amounts of work on a fair number of questions and there were relatively few very weak scripts. Some of the questions offered more challenge to the stronger candidates.

The entry for MM1A was very small and so the comments on the common questions are also based on the responses from the MM1B paper.

### Question 1

This question was done very well by the vast majority of the candidates. Almost all gained full marks on part (a), but a few did make arithmetic errors. Again, in part (b), almost all the candidates found the acceleration correctly, although a few did give the answer  $\frac{4}{3}$ . Part (c) did cause a little more difficulty, although there were many correct responses. The two most common errors were either to assume that the tension was equal to the weight or to make a sign error and obtain an equation such as  $400g - T = 400a$ .

### Question 2

This question was also done well by many candidates. In part (a), there were some confused responses and occasional problems with minus signs. Part (b) was also generally done well. In part (c), a few candidates had problems. The most common of these was to omit an arrow from the diagram to show the force; the other was to use the lengths incorrectly when calculating the angle, for example  $\tan^{-1}\left(\frac{8}{2}\right)$  and  $\sin^{-1}\left(\frac{8}{8.25}\right)$ .

### Question 3

The candidates made good attempts at this question. Some found it difficult to get going in part (a). Most of the candidates who had difficulties had tried to consider particle *A* instead of particle *B*. Generally the candidates made good attempts at parts (b) and (c). In part (d), the main problems were for candidates who found forming an equation of motion difficult. Often, these candidates had also found part (a) difficult. Most candidates were able to make an attempt at part (e) using their answers to parts (c) and (d).

### Question 4

This question tended to be either done very well or very badly. The candidates who drew a correct velocity triangle were able to apply the sine and cosine rules correctly for both parts. However a large number of candidates were not able to do this and based their solutions on a right-angled triangle. A few candidates gained a small number of marks, for example for drawing a correct diagram, but applied the cosine rule incorrectly.

### Question 5

The candidates found this question more demanding, especially part (b). There were many good responses to part (a), but some candidates were not sure about how to go about finding the angle. Part (b) caused more difficulties. Some candidates were not able to form appropriate equations, and some of those who did made mistakes solving them. Some candidates found two times but did not find the difference between them.

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## Question 6

Generally the candidates made quite good attempts at this question, but some parts caused the candidates more difficulty. A few candidates made poor use of vector notation. Part (a) was answered correctly by the vast majority of the candidates. The most common error was dealing incorrectly with the initial velocity. A few went on to simplify their answers incorrectly. Part (b) was a little more demanding, as some candidates confused the components. Part (c) did cause a little more difficulty for some candidates, with a few candidates not giving any answer at all. However, there were again many correct solutions.

In part (d)(i), although there were many correct solutions, some candidates showed that the helicopter was south or north of the origin, rather than specifically north. Interestingly, some candidates who could not answer part (c) were able to write down the position vector at the specified time. A few candidates found the correct position vector but did not conclude that the helicopter was due north.

When answering part (d)(ii), many of the candidates found the correct velocity, but some did not find the speed as requested.

## Question 7

Part (a) was done well by many candidates, although some assumed that the particles had coalesced. Some candidates produced equations with the correct terms, but the incorrect signs. For example, an equation such as  $2m - 6 = 0.5m - 1.5$  was quite a common error.

Some candidates did part (b) very well and gained full marks. However, solutions where only one possible value for  $m$  was obtained correctly were seen quite frequently.

## Coursework Component

A number of scripts had little marking on them; scripts should be full annotated, indicating any calculations checked for accuracy and/or erroneous work or interpretation.

Packages should be sent to the moderator by a means that does not require a signature.

It was pleasing to note that centres had been thorough in obtaining signatures for the Candidate Record Forms from teachers and candidates. There were still some errors in the totalling of marks.

As has been mentioned in previous reports, in “other areas of work” candidates should quote **other** tasks that would use similar skills and techniques to those used in their task: these should not be specific to, or modifications of, their task. For example, if doing a task on a slide, other areas might include modelling the motion of a skier doing a downhill run.

There was not a large amount of work submitted for moderation, but the general standard of work seen was good and appropriately assessed.

## Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.