



**General Certificate of Education**

**Mathematics 6360**

**MM1A      Mechanics 1A**

**Report on the Examination**

*2010 examination – June series*

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## Written Component

### General

The entry for this paper was very small, so the comments made in this report are also, where possible, based on answers given by candidates taking the MM1B paper. The first five questions provided a range of very accessible questions, while the last three questions provided more demand, with some parts challenging the candidates who had found the earlier questions easy. The candidates seemed to cope well with the new style examination papers, although some did have to use extra pages. There were fewer answers given in the questions this series, which reduced the opportunities for candidates to find the “correct” answer from incorrect working.

### Question 1

This question was done well by the vast majority of candidates, with many scoring full marks. Although not made often, the most common error was failing to multiply by 0.5, or divide by 2, when finding the distances in parts (b) and (c). Most candidates used a correct approach to find the average speed in part (d). Another error, seen in part (e), was to find 2400 but not subtract the answer to part (c).

### Question 2

This question was also done well by many candidates. There were relatively few errors on the force diagrams. In part (b)(ii), some candidates made errors, the most common being to multiply the 30 by 0.5 or subtract the 30 from 49. Part (c) caused difficulties for some candidates. The most common errors here were to attempt to include the weight or to omit the friction force.

### Question 3

While there were many good solutions to this question, some candidates made little progress. Some candidates made errors when trying to write down a vector equation based on conservation of momentum. The most common of these errors was to use a mixture of scalars and vectors in the equation. Some candidates were able to form a correct vector equation, but had difficulty extracting the correct equations for each component.

### Question 4

This question was found to be quite difficult by many of the candidates. In part (a) there were a number of incorrect force diagrams, including errors such as including a force acting directly down the slope. In parts (b) and (c) there were a lot of confused answers, mainly due to incorrect attempts at resolving. For example, in part (b), one error was to resolve the normal reaction into components instead of the weight. However, many candidates gained full marks for part (d), where follow-through marks were awarded when the candidates' values from parts (b) and (c) were used correctly in the friction law to find a coefficient of friction.

### Question 5

The candidates generally did well with parts (a) and (b), which were fairly standard, but had more difficulties with the later parts. The main reasons that candidates lost marks in part (a) were because they made errors with the signs in the equations or because they did not form an equation for each particle. Those with sign errors in part (a) often did not obtain the correct tension in part (b).

In part (c), many errors were due to the candidates using the wrong values in the wrong places. For example, in part (c)(i), some used an acceleration of 9.8 instead of 1.96 while in part (c)(ii), some used an acceleration of 1.96 instead of 9.8. Similar confusion concerned the use of the distance of 4 metres in part (c)(i) instead of in part (c)(ii), while the time of 2 seconds was sometimes used in part (c)(ii) instead of in part (c)(i).

## Question 6

The majority of the candidates were able to find the initial velocity as requested in part (a), but most found the rest of the question difficult. A reasonable number of the candidates were able to find the acceleration, some by calculating two velocities and using  $\mathbf{v} = \mathbf{u} + \mathbf{a}t$ , but others clearly could not find a strategy to find the acceleration. Part (c) was found to be more demanding. Some candidates did use the components correctly, but quite a number of candidates did not recognise the approach that was required.

## Question 7

Very many candidates were able to prove the result in part (a). Most considered the vertical component of the velocity and found the result easily. Some tried to find the time of flight first. In some cases these candidates halved their answer, but some did not do this or did not make it clear. A very small number of candidates used equations that they had learned for the time of flight or similar, but did not justify these results and so did not gain the marks. Candidates should not use learned formulae for the range etc in questions like this.

There were many different approaches to part (b)(i). Quite often candidates could produce a correct equation as a starting point, but failed to simplify it correctly. Often the candidates ended up with a mixture of  $\sin\alpha$  and  $\sin^2\alpha$  terms. There were many minor arithmetic or algebraic errors. In part (b)(ii), many candidates used the incorrect time: their approach was based on a time of  $\frac{3\sin\alpha}{2}$  instead of  $3\sin\alpha$ .

## Coursework Component

It is important that all centres read the advice offered on the feedback forms carefully, and particularly so if the form indicates that the centre is close to the tolerance limits, as further drifting from the standard could lead to an adjustment in the centre's marks. As mentioned in previous reports, centres should remember that the moderator has no idea of the individual qualities of the candidates submitting the work; the marks must reflect what is submitted, not what the candidates have done in previous exams or class work.

Centres should ensure that all work is dispatched in appropriate AQA stationery, does not require a signature on delivery, and that the deadlines for submission are met. If a centre does have an issue with making a deadline, then they must contact AQA for advice.

There were some errors in the addition of individual strand marks when totalling scripts. This was usually after changes were made during the internal moderation process. Totals should always be carefully checked.

There was very little work submitted for Mechanics in this series, with 'Basketball' being the most popular task.

## Mark Ranges and Award of Grades

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