



General Certificate of Education

Mathematics 6360

MM1A Mechanics 1A

Report on the Examination

2010 examination – January series

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General

The candidates coped well with the first three questions and produced many good responses. The candidates found some of the material towards the end of the later questions more challenging. When drawing the force diagrams, some candidates did not include arrow heads or label their diagrams clearly. In the 'show that' questions, while there were many good solutions, some candidates did not show all of the working that was needed to gain full marks. It was noticeable that the final answer given on the examination paper often just appeared without the previous step.

Question 1

All of the candidates produced correct solutions and gained full marks.

Question 2

There was a range of responses to this question, with candidates generally doing better on parts (a), (b) and (c) than on part (d).

In part (a) the most common error was to either include or omit a negative sign in the early working, so that a negative time would have been produced if this had been followed through accurately.

In part (b) some candidates used an equation for the height rather than the velocity, but still equated it to zero. A few candidates ignored the initial height. Very few candidates realised that the ball would have the same speed when it returned to its initial position.

Question 3

This question was done well by the majority of candidates. While most candidates were able to produce the printed answer for part (b), there were some issues with the force diagram and finding the tension in part (c). The two main problems with the force diagram were including extra forces, for example friction, or simply poor diagrams without arrows or labels. In part (c) there were some confused responses and some candidates tried to resolve the normal reaction from part (b).

Question 4

Most candidates answered parts (a), (b) and (c) well, although some did get an answer of $-4.5j$ for part (b).

In part (c), the candidates who clearly stated and used a constant acceleration equation usually made a good start and completed the question, although there were a few arithmetic errors.

In part (e) many candidates did not attempt to find the magnitude of the force.

Part (f) was generally found more difficult with only a few good attempts. Several candidates did not attempt this part of the question.

Question 5

The candidates found this question more difficult than expected and there were many candidates who could not give correct responses to parts (c) and (d). While there were many good diagrams, some candidates did not label them clearly or did not include the 300 N force

explicitly. The vast majority of candidates were able to gain all of the marks in part (b), but some did obtain the printed answer without sufficient working.

Part (c) was the most difficult part, with many candidates unsure which part of the train to consider. When candidates did consider the first carriage they often failed to include the 550 N force. The candidates did a little better on part (d), with those who considered the whole train generally being successful. Those who considered only the engine tended to omit the 1100 N force or not to use their answer from part (c).

Question 6

The candidates seemed to be helped by the printed answer in part (a), but some obtained the printed result from the use of equations such as $s = \frac{1}{2}(-9.8) t^2$. There were also some candidates who did not justify all of their working. There were a number of candidates who found it difficult to work with the two components of the velocity in parts (b), (c) and (d).

A reasonably common error was to use 5 instead of 15 in part (b) and then 15 instead of 5 in part (c). Some candidates also stopped after obtaining the vertical component in part (c) and did not go on to find the speed. Those who did find the components correctly were usually able to go on to find the angle correctly.

Question 7

In part (a) many candidates lost marks for not including arrow heads or due to poor labelling of the forces. Several candidates did not show the two tensions as being equal on their diagrams. There were quite a few good attempts at part (b), with attempts at resolving vertically. Part (c) proved to be very challenging, although there were a number of good solutions. A number of candidates gained an M1 mark for the use of the friction law. The most common errors were to omit one force in their equation or to not include the '*ma*' term in their equation of motion.

Coursework Component

There were a number of incorrect totals submitted to AQA due to incorrect additions of the marks from the strands on the Candidate Record Forms; please ensure these are fully checked before final marks are submitted to AQA. This issue seems more prevalent when internal moderation is carried out on the Candidate Record Forms themselves and changes made not accounted for when totalling.

Despite numerous comments in these reports in the past, some centres continue to use postage methods which require a signature; appropriate advice for postage is provided to centres by AQA.

There was little work submitted in this series. However, in a number of scripts sampled candidates were confused about what a particle assumption is, particularly in terms of its mass.

Mark Ranges and Award of Grades

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