



A-LEVEL MATHEMATICS

Mechanics MM05
Report on the Examination

6360
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General Comments

Candidates generally found the paper quite accessible with the exception of the final question, where candidates found difficulty in both setting up and solving the differential equation.

Question 1

This was done very well by the vast majority of candidates with very many correct solutions. The main error seen in part (a) was for candidates to state that $0.8 = 0.4\omega$ instead of $0.8 = 0.2\omega$.

The main error seen in part (b) was due to a confusion over the distances involved.

In part (c), quite a number of different but equivalent expressions were seen.

Those who had worked through the earlier parts correctly had little difficulty in obtaining the correct time in part (d).

Question 2

This question was done well by a very large proportion of candidates. A few candidates used half of the period instead of a quarter of the period when finding the times for each part of the motion.

Question 3

There were a lot of good responses to this question which demonstrated a good understanding of the topic. In part (a), the most common issue was not to introduce t and only to produce expressions in terms of θ . However candidates who did this were able to recover in part (b) and the fact that they worked with θ did not prevent them from gaining full marks on part (b).

Question 4

There were very many good responses to this question. Part (a) was often done well. Candidates set out good solutions showing the EPEs and GPEs clearly. Occasionally incorrect extensions were seen in the EPE expressions.

Candidates who had experienced difficulties with part (a) were able to use the printed answer and proceed well with parts (b) and (c). A few candidates gave their answer to part (b) in degrees rather than radians.

Question 5

In part (a), most candidates found the extension correctly, but did not always give the required distance.

Setting up the equation in part (b)(i) caused a few difficulties for some candidates, usually linked to the application of Hooke's Law in this context. However, almost all candidates were able to make a good attempt at (b)(ii). The main issues were related to the manipulation required to find the constants. A few candidates solved the auxiliary equation incorrectly and worked with incorrect exponential functions.

The final part was often answered well, although the answer "critical damping" was seen several times.

Question 6

Most candidates found this question to be difficult.

In part (a), the very common and very significant issue was not to include the tension in the string in any way. When dealing with connected bodies in questions like this candidates need to appreciate that each body needs to be considered separately. In part (b) while many candidates realised that they needed to split the expression into two parts to integrate it, very few realised that one of these parts would be a constant term. Those who did this usually completed the integration to find the velocity without difficulty, but those who didn't made very little progress.

In part (c) many candidates were able to find the time that they needed to use, even though many did not have a suitable expression for the velocity into which to substitute this value.

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