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Examiners' Report/
Principal Examiner Feedback

Summer 2013

GCE Mechanics M5 (6681)
Paper 01R

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Introduction

The paper proved to be considerably more accessible than last year's, but most were able to complete it in the time allowed. Much of the work produced was clearly and logically presented but some candidates need to be reminded to include full explanations of methods used and a number of solutions were difficult to read and difficult to follow. Candidates also need to read questions carefully and ensure that they answer the question asked. By far the best source of marks came from question 1 and the one that caused the most difficulty was question 6. Some candidates were very well-prepared but others had no idea on how to start some of the questions.

In calculations the numerical value of g which should be used is 9.8, as advised on the front of the question paper. Final answers should then be given to 2 (or 3) significant figures – more accurate answers will be penalised, including fractions.

In all cases, as stated on the front of the question paper, candidates should show sufficient working to make their methods clear to the Examiner. If there is a printed answer to show then candidates need to ensure that they show sufficient detail in their working to warrant being awarded all of the marks available. Candidates who cannot reach a given answer should be advised to look for their error rather than adapt work which might well have been correct – they often lose more marks than they gain through this tactic.

If a candidate runs out of space in which to give their answer than they are advised to use a supplementary sheet – if a centre is reluctant to supply extra paper then it is crucial for the candidate to say whereabouts in the script the extra working is going to be done.

Report on Individual Questions

Question 1

This proved to be a straightforward starter and although there were many fully correct solutions, a few wrote down an incorrect auxiliary equation and could only score the method marks.

Question 2

In part (a) the methods were generally known and most scored the first two marks but there were occasionally a few calculation errors in the vector products. The second part was less successful with some method errors although there was a follow through mark available on incorrect vector products from part (a).

Question 3

In part (a) most candidates used an impulse-momentum equation and worked from first principles but there were occasional sign errors and $\frac{\mathrm{d}m}{\mathrm{d}t}$ was then taken as c in order to obtain the printed answer. In the second part most gained the first mark and tried to separate the variables and integrate. A few weak candidates took m as a constant at this point. Only the best candidates were able to get the final answer and many of the weaker candidates scored zero.

Question 4

As in previous years, finding a moment of inertia using integration proved to be taxing for a number of candidates but it was pleasing to see just over forty per cent of the candidates producing completely correct solutions this time. The bulk of the marks required a complete method and some candidates, who correctly tried to split the moment of inertia into two parts, using the parallel axes rule, either failed to tackle the second part correctly or just failed to do this at all thereby losing most of the marks.

Question 5

Just under half of the candidates scored full marks on this question and there were some very neat solutions to part (a). Weaker candidates, however, often made no progress at all. In the second part they could use the given answer in part (a) to adjust the moment of inertia and the methods were mostly well known. A few candidates quoted a formula, ignoring the instruction in the question, and gained no marks.

Question 6

This question was relatively poorly answered with a modal mark of 4 out of 15 achieved by a quarter of the candidates, usually in part (a), where the printed answer helped. The second part was a discriminator with many unable to make a start. A number of candidates considered the system in a general position and ignored the fact that question was about the position when the disc was horizontal, thus making the question much more difficult. Some candidates used a general energy equation which they then differentiated to find the angular acceleration rather than simply taking moments for the horizontal position.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
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