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Examiners' Report

Summer 2014

Pearson Edexcel GCE in Mechanics M1R (6677/01R)

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Mathematics Unit Mechanics 1

Specification 6677/01R

General Introduction

The vast majority of students seemed to find the paper to be of a suitable length, with no evidence of students running out of time. There were some parts of all questions which were accessible to the majority. Generally, students who used large and clearly labelled diagrams and who employed clear, systematic and concise methods were the most successful.

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.

If there is a printed answer to show then students need to ensure that they show sufficient detail in their working to warrant being awarded all of the marks available. In all cases, as stated on the front of the question paper, students should show sufficient working to make their methods clear to the Examiner.

Question 1

This question proved to be an accessible started for the vast majority of students. Most chose to resolve parallel and perpendicular to the slope and achieved the correct answers. Because g was not involved, there was no upper limit to the accuracy of the answers but we were expecting at least 2 significant figures.

Question 2

In Q02(a) most scored the first two marks for adding the two vectors to find the resultant but then many just equated their resultant to $2\mathbf{i} + \mathbf{j}$ and obtained $q = 3$ instead of using a ratio. Some subtracted the vectors to get the resultant rather than added. In Q02(b) some found a scalar quantity for the acceleration and then continued just using scalars. A sizeable minority obtained a velocity vector but then forgot to use Pythagoras to find the speed.

Question 3

In Q03(a) most $v-t$ graphs were well constructed although the second horizontal line was sometimes missed leading to a number of lost marks in Q03(c) and Q03(d). The second part was answered well by the vast majority and in Q03(c) there were a few sign errors but the times were generally found successfully. In the final part occasionally halves were missed off areas of triangles calculations but generally fewer errors were made by using rectangles and triangles rather than trapezia to find the required total area.

Question 4

Q04(a) was generally well done and most were able to find the given answer in the second part. However, the final part was much more challenging and confusion between t and T caused many of the problems.

Question 5

Q05(a) was mostly well done although some omitted the m's from the 'ma' term in their equations of motion which nonetheless still led to the given answer for T and examiners had to be alert to ensure that unwarranted marks weren't awarded.

The second part was only really successfully done by more able students due to the algebra involved. Many used g not $0.2g$ and added 1.5 m instead of doubling their distance. In Q03(c) m was used in the impulse-momentum equation instead of $3m$ in the majority of cases

Question 6

The first part was answered very well by the vast majority but in Q06(b) most marks lost were due to students assuming that $T_C = 2T_B$ from Q06(a). The final part was found to be challenging by most and a lot of students used an = sign in their working and substituted the inequality at the end which lost marks.

Question 7

In Q07(a) there were a few errors with angles and some sin/cos confusion but generally this was well done. Most marks lost were due to over-accuracy of the answer after use of $g = 9.8$.

There were some sign errors in the second part but most students were able to make a good attempt at finding a value for μ. In Q07(c) most were able to find the component of the weight down the plane but many lost the rest of marks by using the original value of the friction. Also a good number of answer marks were lost due to the use of a rounded value of μ which gave a value of 4.66 N instead of 4.70 N for the limiting friction force.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

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