A-level

Mathematics

MM2B

Report on the Examination

6360

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General

The early questions proved to be a pleasing introduction to the paper with most candidates achieving good marks on these. Questions 8 and 9 were found more demanding and these were designed to discriminate between candidates at the higher range of the ability spectrum

Question 1

Part (a) was usually answered correctly but a few candidates made errors in signs. In part (b) a number of candidates left the answer as -12 and did not find the magnitude as required.
In part (c) the common error was in finding the $+ c$ term incorrectly.

Question 2

Most candidates showed that they knew the techniques involved in solving this question but unfortunately they often forgot to include the mass of the rod. A high proportion of candidates did not obtain $20\ \text{kg}$, which was the correct total of the masses.

Question 3

This question was usually answered well. However a significant proportion of candidates did not find the correct vertical difference between the top of the slide and the end of the slide. In part (c) some candidates did not use the distance travelled [5m] which was needed to find the work done.

Question 4

Most candidates in part (a) resolved correctly and found the tension in the string AP.
Unfortunately when evaluating $\frac{5g}{cos20}$ a number of candidates used the 20 as radians rather than degrees.
In part (b) a significant proportion of candidates used the printed answer to rewrite the equation and hence give a different line before obtaining the printed answer; this was not accepted as the question was a 'show that'. However most candidates correctly resolved horizontally and then converted their $\text{T}_{\text{AB}} \sin 20$ into $5\text{g} \tan 20$.
In part (c) candidates found difficulty in solving $\frac{25}{3}v^2 = 5\text{g} \tan 20 + \frac{5g}{\cos 20}$

Question 5

Most candidates correctly found the angular speed in radians per second. They also appreciated the need to resolve vertically at the highest and lowest point of the washing machine's cycle. However candidates often used an incorrect numerical value for the mass. A few candidates did not read the question carefully and did not appreciate that the angular speed was a constant.

Question 6

Many candidates realised that they needed to consider the accelerating force [1400×0.2] the gravitational force [$1400\, g \sin\theta$] and the driving force exerted by the engine [4555] .Unfortunately candidates often did not connect all these terms and the resistance force [4000] correctly.

Question 7

A number of candidates used an incorrect $F = ma$ equation and then invented a minus sign to obtain the printed equation in part (a).

In part (b) some candidates separated the terms incorrectly starting with $\int -\frac{3}{10} dt = \int (v - 2.94) dv$.

Most candidates correctly used separation of variables.

The conversion of $\ln(v - 2.94) = -\frac{10}{3} t + \ln 27.06$ into a non log equation was frequently incorrect.

Question 8

In part (a) candidates needed to consider gravitational potential energy, kinetic energy and elastic potential energy at the start of Carol's bungee jump and after she had fallen x m.

Unfortunately a significant number of candidates did not, after Carol had fallen x metres, use the correct extension in the formula for the elastic potential energy or the correct change in the potential energy between these two points. Part (b) was answered well but the candidates' interpretations of what was happening in parts (c) and (d) were often not correct. In part (c) the maximum value of x was when the value of v [found in part (a)] was zero. The distance fallen by Carol when her speed was a maximum was often taken to be when x was 26 but, of course, even when the cord was just taut Carol is still accelerating.

Question 9

As intended, this was a discriminatory question between the grade A candidates and those worthy of a grade A*. There were quite a few impressive solutions to this question.

Candidates needed to find the distance PT and to resolve in two directions, normally perpendicular to the rod and parallel to the rod, or vertically and horizontally. These two equations, together with the length PT and moments about P, produced equations which could be solved to find μ .

Other candidates took moments about the midpoint of the rod and resolved horizontally thus finding two equations which did not include the mass. These two equations equally could be solved to find μ .

Many candidates omitted one or more of the terms in their resolving, or when taking moments, or used the point T to be the midpoint of the rod.

When candidates took moments they frequently omitted the distance in some of their terms.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

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Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator