

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson Edexcel
Level 3 GCE**

Centre Number

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Candidate Number

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Thursday 14 May 2020

Afternoon

Paper Reference **8FM0/25**

Further Mathematics

Advanced Subsidiary

Further Mathematics options

25: Further Mechanics 1

(Part of options C, E, H and J)

You must have:

Mathematical Formulae and Statistical Tables (Green), calculator

Total Marks

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Candidates may use any calculator allowed by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Unless otherwise indicated, whenever a value of g is required, take $g = 9.8 \text{ m s}^{-2}$ and give your answer to either 2 significant figures or 3 significant figures.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- The total mark for this part of the examination is 40. There are 4 questions.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Question 1 continued

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(Total for Question 1 is 5 marks)



Question 3 continued

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Question 3 continued

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4. A small ball, of mass m , is thrown vertically upwards with speed $\sqrt{8gH}$ from a point O on a smooth horizontal floor. The ball moves towards a smooth horizontal ceiling that is a vertical distance H above O . The coefficient of restitution between the ball and the ceiling is $\frac{1}{2}$

In a model of the motion of the ball, it is assumed that the ball, as it moves up or down, is subject to air resistance of constant magnitude $\frac{1}{2}mg$.

Using this model,

- (a) use the work-energy principle to find, in terms of g and H , the speed of the ball immediately before it strikes the ceiling, (5)
- (b) find, in terms of g and H , the speed of the ball immediately before it strikes the floor at O for the first time. (5)

In a simplified model of the motion of the ball, it is assumed that the ball, as it moves up or down, is subject to no air resistance.

Using this simplified model,

- (c) explain, without any detailed calculation, why the speed of the ball, immediately before it strikes the floor at O for the first time, would still be less than $\sqrt{8gH}$ (1)



Question 4 continued

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