



Cambridge International AS & A Level

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FURTHER MATHEMATICS

9231/34

Paper 3 Further Mechanics

May/June 2025

1 hour 30 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- Where a numerical value for the acceleration due to gravity (g) is needed, use 10 m s^{-2} .

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

This document has **16** pages. Any blank pages are indicated.

- The particle is pushed vertically downwards until the length of the spring is $\frac{3}{5}a$. The system is then released from rest.

[illegible]



- 2 A particle P of mass m kg moves along a horizontal straight line against a resistive force of magnitude $2mv^3$ N, where v ms⁻¹ is the velocity of P at time t s. When $t = 0$, $v = 1$.

(a) Find an expression for v in terms of t . [4]

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(b) Find the displacement of P from its initial position when $t = 6$. [3]

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- (a) Derive the equation of the trajectory of P in the form

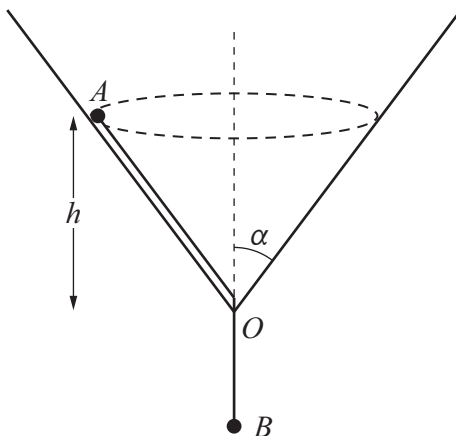
$$y = x \tan \alpha - \frac{gx^2}{2u^2} \sec^2 \alpha. \quad [4]$$

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for handwriting practice or general writing. There are no margins, text, or other markings on the page.



(b) Find the possible values of $\tan \alpha$. [3]

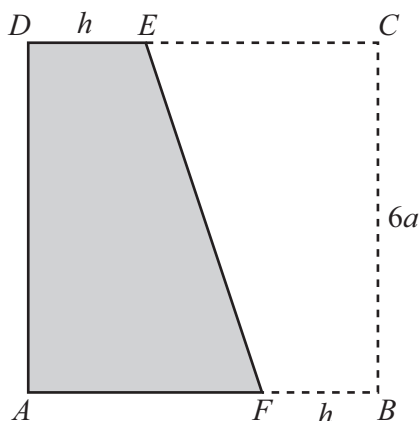
[illegible]



Find ω in terms of g and h .

[6]

[illegible]



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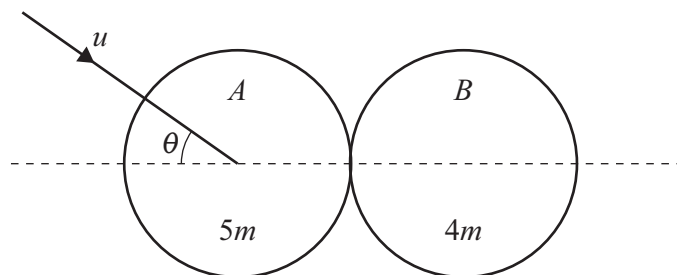
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When the lamina $AFED$ is suspended from the point D , the edge DA makes an angle θ with the downward vertical, where $\tan \theta = \frac{7}{15}$.

- (b)** Find, in terms of a , the two possible values of h . [3]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.



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(b) Given that $\tan \theta = \frac{2}{3}$, find the value of e . [6]

[illegible]

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[8]

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Handwriting practice area with 20 sets of horizontal dotted lines.





Additional Page

If you use the following lined page to complete the answer(s) to any question(s), the question number(s) must be clearly shown.

Lined area for writing answers, consisting of multiple horizontal dotted lines.







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