

Please check the examination details below before entering your candidate information

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| Candidates surname | | | | | Other names | | | | |
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Pearson Edexcel International Advanced Level

Time 1 hour 30 minutes

Paper
reference

WME01/01

Mathematics

International Advanced Subsidiary/Advanced Level
Mechanics M1

You must have:

Mathematical Formulae and Statistical Tables (Yellow), calculator

Total Marks

Candidates may use any calculator permitted 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.
- Whenever a numerical 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.
- There are 8 questions in this question paper. The total mark for this paper is 75.
- 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.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

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4. The position vector, \mathbf{r} metres, of a particle P at time t seconds, relative to a fixed origin O , is given by

$$\mathbf{r} = (t - 3)\mathbf{i} + (1 - 2t)\mathbf{j}$$

- (a) Find, to the nearest degree, the size of the angle between \mathbf{r} and the vector \mathbf{j} , when $t = 2$ (3)
- (b) Find the values of t for which the distance of P from O is 2.5 m. (5)

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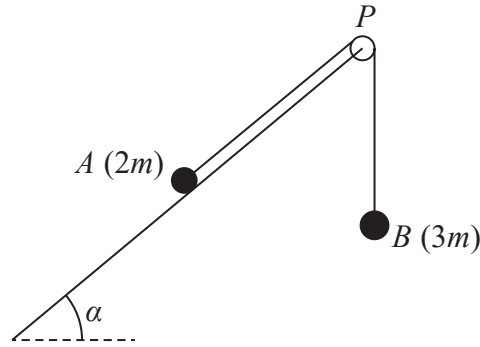


Figure 4

One end of a light inextensible string is attached to a particle A of mass $2m$. The other end of the string is attached to a particle B of mass $3m$. The string passes over a small, smooth, light pulley P which is fixed at the top of a rough inclined plane. The plane is inclined to the horizontal at an angle α , where $\tan \alpha = \frac{3}{4}$

Particle A is held at rest on the plane with the string taut and B hanging freely below P , as shown in Figure 4. The section of the string AP is parallel to a line of greatest slope of the plane.

The coefficient of friction between A and the plane is $\frac{1}{2}$

Particle A is released and begins to move up the plane.

For the motion before A reaches the pulley,

- (a) (i) write down an equation of motion for A ,
(ii) write down an equation of motion for B , (4)
- (b) find, in terms of g , the acceleration of A , (5)
- (c) find the magnitude of the force exerted on the pulley by the string. (4)
- (d) State how you have used the information that P is a smooth pulley. (1)



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