

Write your name here

Surname

Other names

**Pearson Edexcel**  
**International**  
**Advanced Level**

Centre Number

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Candidate Number

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# Mechanics M1

## Advanced/Advanced Subsidiary

Monday 25 January 2016 – Afternoon  
**Time: 1 hour 30 minutes**

Paper Reference

**WME01/01**

**You must have:**

Mathematical Formulae and Statistical Tables (Blue)

Total Marks

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**Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. 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). Coloured pencils and highlighter pens must not be used.
- **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 two significant figures or three significant figures.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

### Information

- 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.

Turn over ►

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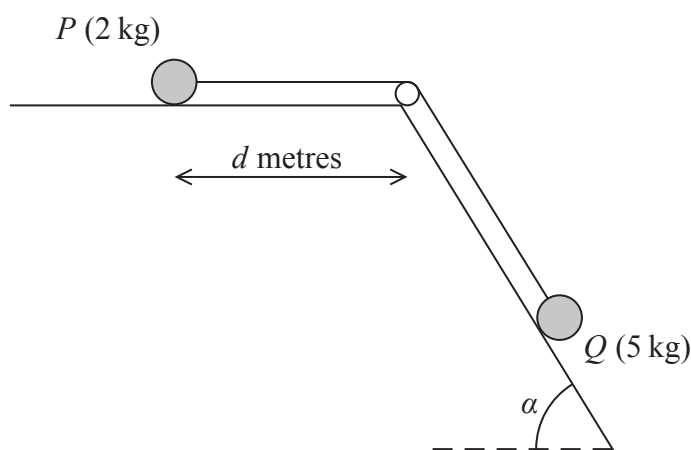


Figure 3

A particle  $P$  of mass 2 kg is attached to one end of a light inextensible string. A particle  $Q$  of mass 5 kg is attached to the other end of the string. The string passes over a small smooth light pulley. The pulley is fixed at a point on the intersection of a rough horizontal table and a fixed smooth inclined plane. The string lies along the table and also lies in a vertical plane which contains a line of greatest slope of the inclined plane. This plane is inclined to the horizontal at an angle  $\alpha$ , where  $\tan \alpha = \frac{3}{4}$ . Particle  $P$  is at rest on the table, a distance  $d$  metres from the pulley. Particle  $Q$  is on the inclined plane with the string taut, as shown in Figure 3. The coefficient of friction between  $P$  and the table is  $\frac{1}{4}$ .

The system is released from rest and  $P$  slides along the table towards the pulley.

Assuming that  $P$  has not reached the pulley and that  $Q$  remains on the inclined plane,

- (a) write down an equation of motion for  $P$ , (2)
- (b) write down an equation of motion for  $Q$ , (2)
- (c) (i) find the acceleration of  $P$ ,  
(ii) find the tension in the string. (5)

When  $P$  has moved a distance 0.5 m from its initial position, the string breaks. Given that  $P$  comes to rest just as it reaches the pulley,

- (d) find the value of  $d$ . (7)

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