

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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**Monday 19 October 2020**

Afternoon

Paper Reference **9MA0/32**

**Mathematics**

**Advanced**

**Paper 32: Mechanics**

**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 50. There are 5 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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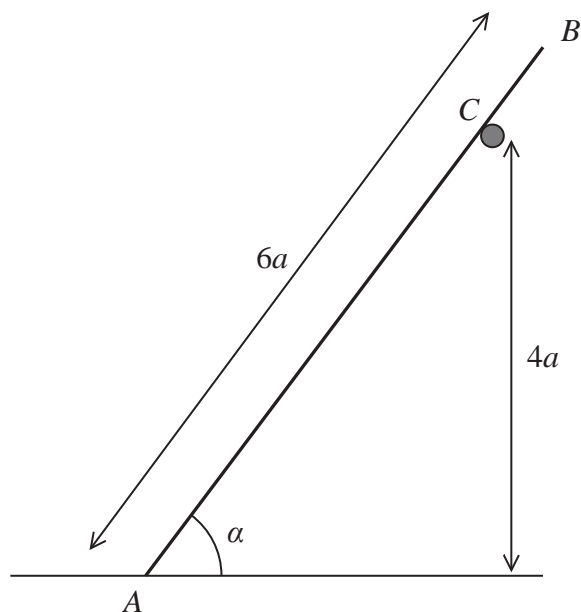


Figure 1

A ladder  $AB$  has mass  $M$  and length  $6a$ .

The end  $A$  of the ladder is on rough horizontal ground.

The ladder rests against a fixed smooth horizontal rail at the point  $C$ .

The point  $C$  is at a vertical height  $4a$  above the ground.

The vertical plane containing  $AB$  is perpendicular to the rail.

The ladder is inclined to the horizontal at an angle  $\alpha$ , where  $\sin \alpha = \frac{4}{5}$ , as shown in Figure 1.

The coefficient of friction between the ladder and the ground is  $\mu$ .

The ladder rests in limiting equilibrium.

The ladder is modelled as a uniform rod.

Using the model,

(a) show that the magnitude of the force exerted on the ladder by the rail at  $C$  is  $\frac{9Mg}{25}$  (3)

(b) Hence, or otherwise, find the value of  $\mu$ . (7)



















