

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	



General Certificate of Education  
Advanced Level Examination  
January 2013

# Mathematics

# MM2B

## Unit Mechanics 2B

Monday 28 January 2013 9.00 am to 10.30 am

**For this paper you must have:**

- the blue AQA booklet of formulae and statistical tables.

You may use a graphics calculator.

### Time allowed

- 1 hour 30 minutes

### Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Write the question part reference (eg (a), (b)(i) etc) in the left-hand margin.
- You must answer each question in the space provided for that question. If you require extra space, use an AQA supplementary answer book; do **not** use the space provided for a different question.
- Do not write outside the box around each page.
- Show all necessary working; otherwise marks for method may be lost.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- The **final** answer to questions requiring the use of calculators should be given to three significant figures, unless stated otherwise.
- Take  $g = 9.8 \text{ m s}^{-2}$ , unless stated otherwise.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 75.

### Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- You do not necessarily need to use all the space provided.



J A N 1 3 M M 2 B 0 1



QUESTION  
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REFERENCE

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QUESTION  
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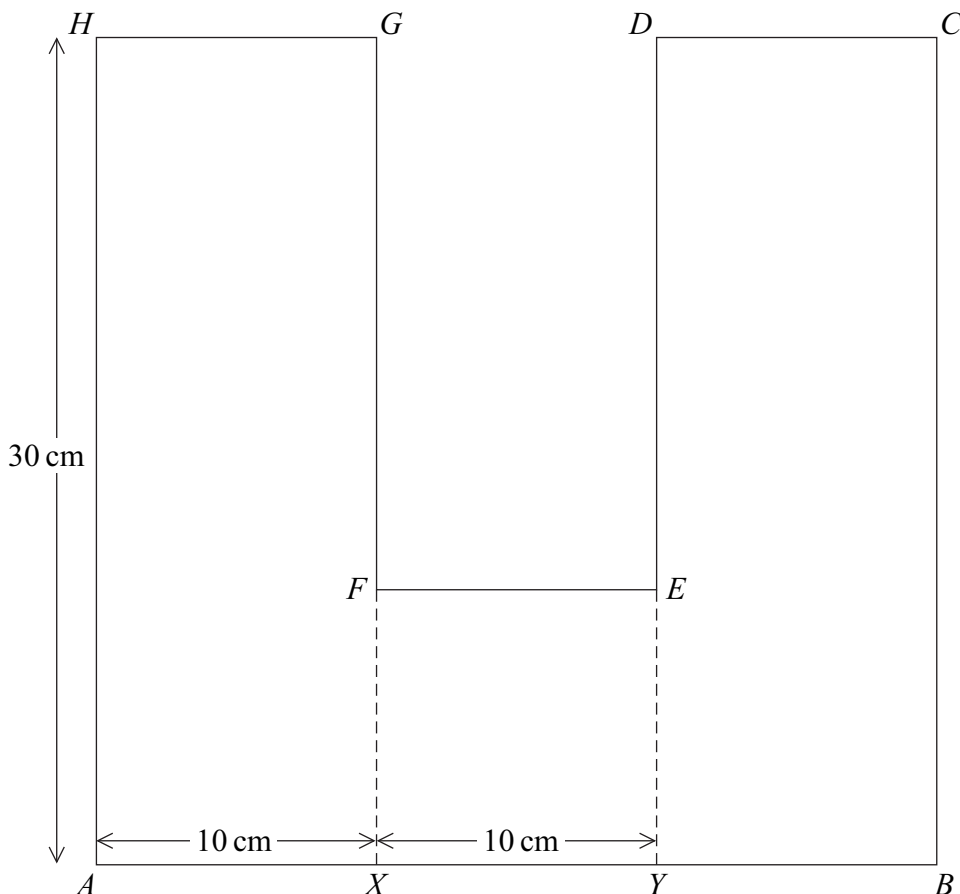






- 4 The diagram shows a uniform lamina which is in the shape of two identical rectangles  $AXGH$  and  $YBCD$  and a square  $XYEF$ , arranged as shown.

The length of  $AX$  is 10 cm, the length of  $XY$  is 10 cm and the length of  $AH$  is 30 cm.



- (a) Explain why the centre of mass of the lamina is 15 cm from  $AH$ . (1 mark)
- (b) Find the distance of the centre of mass of the lamina from  $AB$ . (3 marks)
- (c) The lamina is freely suspended from the point  $H$ .

Find, to the nearest degree, the angle between  $HG$  and the horizontal when the lamina is in equilibrium. (4 marks)





QUESTION  
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QUESTION  
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QUESTION  
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QUESTION  
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QUESTION  
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QUESTION  
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QUESTION  
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QUESTION  
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QUESTION  
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QUESTION  
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REFERENCE

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