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|---------------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre Number       |  |  |  |  |  | Candidate Number |  |  |  |  |
| Surname             |  |  |  |  |  |                  |  |  |  |  |
| Other Names         |  |  |  |  |  |                  |  |  |  |  |
| Candidate Signature |  |  |  |  |  |                  |  |  |  |  |



General Certificate of Education  
Advanced Subsidiary Examination  
June 2009

# Mathematics

# MM1B

## Unit Mechanics 1B

**Specimen paper for examinations in June 2010 onwards**

**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 the questions in the space provided. 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.
- Unit Mechanics 1B has a **written paper only**.

### Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.

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

Answer **all** questions in the spaces provided.

- 1** Two particles,  $A$  and  $B$ , are moving on a smooth horizontal surface when they collide. During the collision, the two particles coalesce to form a single combined particle. Particle  $A$  has mass 3 kg and particle  $B$  has mass 7 kg.

Before the collision, the velocity of  $A$  is  $\begin{bmatrix} 6 \\ -2 \end{bmatrix} \text{ m s}^{-1}$  and the velocity of  $B$  is  $\begin{bmatrix} -1 \\ 4 \end{bmatrix} \text{ m s}^{-1}$ .

- (a)** Find the velocity of the combined particle after the collision. *(3 marks)*
- (b)** Find the speed of the combined particle after the collision. *(2 marks)*

QUESTION  
PART  
REFERENCE





































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