



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Advanced Level

**MATHEMATICS**

**9709/53**

Paper 5 Mechanics 2 (M2)

**October/November 2013**

**1 hour 15 minutes**

Additional Materials:      Answer Booklet/Paper  
                                         Graph Paper  
                                         List of Formulae (MF9)



**READ THESE INSTRUCTIONS FIRST**

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** the questions.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

Where a numerical value for the acceleration due to gravity is needed, use  $10 \text{ m s}^{-2}$ .

The use of an electronic calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 50.

Questions carrying smaller numbers of marks are printed earlier in the paper, and questions carrying larger numbers of marks later in the paper.

This document consists of **3** printed pages and **1** blank page.



2

1  $t$   $ttt$   $ttt$   $ttt$   $tt$   $tt$   $tt$   $xt$   $t$   
 $tt$   $t$   $v$   $t$   $t$   $tt$   
 $t$   
 $tt$

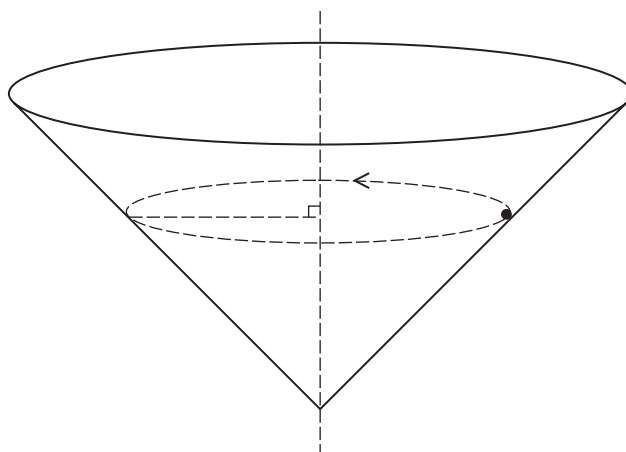
2  $t$   $ttt$   $vt$   $vt$   
 $t$   $tvt$   $t$   $t$   
 $t$

(i)  $tt$  —

(ii)  $t v$   $t vt$   $tt$

(iii)  $tttv$

3



$t$   $v$   $t$   $tt$   
 $x$   $t$   $t$   $x$   $vt$   $t$   $v$   $t$   $x$   $vt$   
 $tt$   $t$   $vt$   $t$   
 $ttt$   $t$   $xt$   $t$   $t$   $vt$

4  $t$   $tttv$   $t$   
 $t$   $v$   $tt$   $tt$   $tttv$   $vt$   
 $t$   $t$   $t$   $tt$   $tt$   
 $t$   $t$

(i)  $x$   $tt$   $t$   $tt$   $tt$

• • ••

(ii)  $t v$   $tt$

(iii)  $t v$   $ttv$

3

5 *t vt v v t* *tt* *t*  
*vtt t* *ttt t t*

(i) *t t t* *tttt*

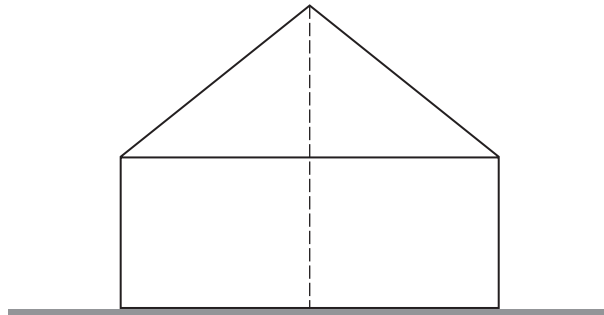
(ii) *tt* *tttt* *ttt*

6 *O ttt tt* *tt tt*  
*xt* *t* *tttt tt* *t*  
*t* *t vt*

(i) *tt*

(ii) *tt* *t*

7



*tt t*  
*t ttt t tt*  
*t tt t t*

(i) *tttt t vt*

*t t* *t t* *tt*  
*vtx t t vt tttt*

(ii) *ttv* *t ttt*

(iii) *tt v tt ttt t*

*t* *v t ttv t* *ttt t* *tt*  
*tttt t*  
*ttt ttx t t tt*  
*t ttt*

(iv) *ttt t t t*

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