

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

Wednesday 22 January 2014 – Morning
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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**PEARSON**

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Question 6 continued

A series of horizontal lines for writing the answer to Question 6.



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Question 6 continued

Ruled area for writing the answer to Question 6.



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7. A force **F** is given by $\mathbf{F} = (9\mathbf{i} + 13\mathbf{j}) \text{ N}$.

(a) Find the size of the angle between the direction of **F** and the vector **j**. (3)

The force **F** is the resultant of two forces **P** and **Q**. The line of action of **P** is parallel to the vector $(2\mathbf{i} - \mathbf{j})$. The line of action of **Q** is parallel to the vector $(\mathbf{i} + 3\mathbf{j})$.

(b) Find, in terms of **i** and **j**,
(i) the force **P**,
(ii) the force **Q**. (9)



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8. Two trains, *A* and *B*, start together from rest, at time $t = 0$, at a station and move along parallel straight horizontal tracks. Both trains come to rest at the next station after 180 s.

Train *A* moves with constant acceleration $\frac{2}{3} \text{ m s}^{-2}$ for 30 s, then moves at constant speed

for 120 s and then moves with constant deceleration for the final 30 s. Train *B* moves with constant acceleration for 90 s and then moves with constant deceleration for the final 90 s.

(a) Sketch, on the same axes, the speed–time graphs for the motion of the two trains between the two stations. (3)

(b) Find the acceleration of train *B* for the first half of its journey. (5)

(c) Find the times when the two trains are moving at the same speed. (4)

(d) Find the distance between the trains 96 s after they start. (5)

Horizontal lines for writing answers.



