

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 6 June 2018 – 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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5. [In this question \mathbf{i} and \mathbf{j} are perpendicular horizontal unit vectors and position vectors are given relative to a fixed origin O .]

A particle P is moving in a straight line with constant velocity. At 9 am, the position vector of P is $(7\mathbf{i} + 5\mathbf{j})$ km and at 9.20 am, the position vector of P is $6\mathbf{i}$ km. At time t hours after 9 am, the position vector of P is \mathbf{r}_p km.

- (a) Find, in kmh^{-1} , the speed of P . (4)

- (b) Show that $\mathbf{r}_p = (7 - 3t)\mathbf{i} + (5 - 15t)\mathbf{j}$. (2)

- (c) Find the value of t when \mathbf{r}_p is parallel to $16\mathbf{i} + 5\mathbf{j}$. (4)

The position vector of another particle Q , at time t hours after 9 am, is \mathbf{r}_q km, where $\mathbf{r}_q = (5 + 2t)\mathbf{i} + (-3 + 5t)\mathbf{j}$

- (d) Show that P and Q will collide and find the position vector of the point of collision. (5)

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