

Write your name here

Surname

Other names

Pearson Edexcel
Level 3 GCE

Centre Number

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Candidate Number

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Further Mathematics

Advanced Subsidiary
Further Mathematics options
26: Further Mechanics 2
(Part of option J only)

Thursday 17 May 2018 – Afternoon

Paper Reference

8FM0-26

You must have:

Mathematical Formulae and Statistical Tables, calculator

Total Marks

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).
- **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.
- Answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- The total mark for this part of the examination is 40. There are 4 questions.
- 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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Question 1 continued

Lined area for writing the answer to Question 1.

(Total for Question 1 is 7 marks)



2. A car moves round a bend which is banked at a constant angle of θ° to the horizontal.

When the car is travelling at a constant speed of 80 km h^{-1} there is no sideways frictional force on the car. The car is modelled as a particle moving in a horizontal circle of radius 500 m .

- (a) Find the value of θ .

(7)

- (b) Identify one limitation of this model.

(1)

The speed of the car is increased so that it is now travelling at a constant speed of 90 km h^{-1} . The car is still modelled as a particle moving in a horizontal circle of radius 500 m .

- (c) Describe the extra force that will now be acting on the car, stating the direction of this force.

(1)

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Question 2 continued

Lined area for writing the answer to Question 2.

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Question 2 continued

Lined area for writing the answer to Question 2.

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Question 2 continued

Lined area for writing the answer to Question 2.

(Total for Question 2 is 9 marks)



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The centre of mass of L is at the point G .

- (1)

- (7)

(3)

Question 3 continued

Handwriting practice area with 25 horizontal lines.

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Question 3 continued

Handwriting practice area with 28 horizontal lines.

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Question 3 continued

Handwriting practice area with 30 horizontal lines.

(Total for Question 3 is 11 marks)



4. A particle, P , moves on the x -axis. At time t seconds, $t \geq 0$, the velocity of P is $v \text{ ms}^{-1}$ in the direction of x increasing and the acceleration of P is $a \text{ ms}^{-2}$ in the direction of x increasing.

When $t = 0$ the particle is at rest at the origin O .

Given that $a = \frac{5}{2}(5 - v)$

- (a) show that $v = 5(1 - e^{-2.5t})$

- (b) state the limiting value of v as t increases. (1)

At the instant when $v = 2.5$, the particle is d metres from O .

- (c) Show that $d = 2 \ln 2 - 1$ (7)



Question 4 continued

Lined area for writing the answer to Question 4.

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Question 4 continued

Lined area for writing the answer to Question 4.

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Question 4 continued

Lined area for writing the answer to Question 4.

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Question 4 continued

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(Total for Question 4 is 13 marks)

TOTAL FOR FURTHER MECHANICS 2 IS 40 MARKS

