

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

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Candidate Number

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Tuesday 19 January 2021

Morning (Time: 1 hour 30 minutes)

Paper Reference **WME01/01**

Mathematics

International Advanced Subsidiary/Advanced Level
Mechanics M1

You must have:

Mathematical Formulae and Statistical Tables (Blue), calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. 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.
- Whenever a numerical value of g is required, take $g = 9.8 \text{ m s}^{-2}$, and give your answer to either 2 significant figures or 3 significant figures.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 8 questions in this question paper. 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.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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Question 1 continued

Lined area for writing the answer to Question 1.

(Total 6 marks)

Q1



- (b) the speed of Q immediately after the collision. (3)

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Question 2 continued

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(Total 6 marks)

Q2



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Question 3 continued

Lined area for writing the answer to Question 3.

(Total 9 marks)

Q3



The diagram shows a horizontal beam of length 6 m, labeled AB. There are two supports, represented by black triangles, located at points C and D. Point C is 1 m from point A, and point D is 1 m from point B. The total length of the beam is indicated as 6 m above it. The distances from A to C and from D to B are each indicated as 1 m above the beam.

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Question 4 continued

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(Total 6 marks)

Q4



5. A particle is acted upon by two forces **F** and **G**. The force **F** has magnitude 8 N and acts in a direction with a bearing of 240° . The force **G** has magnitude 10 N and acts due South.

Given that $\mathbf{R} = \mathbf{F} + \mathbf{G}$, find

- (i) the magnitude of **R**,
(ii) the direction of **R**, giving your answer as a bearing to the nearest degree.

(7)

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Question 5 continued

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(Total 7 marks)

Q5



- (d) Find the distance between the two girls when they are closest together. (4)

Question 6 continued

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Question 6 continued

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Question 6 continued

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(Total 12 marks)

Q6



- The parachutist is modelled as a particle.

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- This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question 7 continued

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Question 7 continued

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Question 7 continued

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(Total 12 marks)

Q7



8.

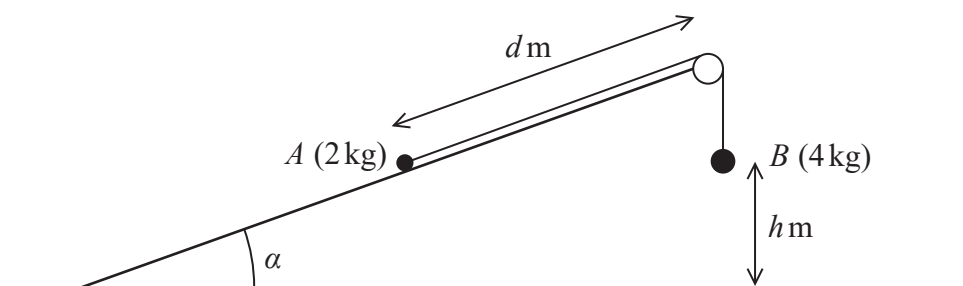


Figure 3

Two particles, A and B , have masses 2 kg and 4 kg respectively. The particles are connected by a light inextensible string. The string passes over a small smooth pulley which is fixed at the top of a rough plane. The plane is inclined to the horizontal ground at an angle α where $\tan \alpha = \frac{3}{4}$. The particle A is held at rest on the plane at a distance d metres from the pulley. The particle B hangs freely at rest, vertically below the pulley, at a distance h metres above the ground, as shown in Figure 3. The part of the string between A and the pulley is parallel to a line of greatest slope of the plane. The coefficient of friction between A and the plane is $\frac{1}{4}$.

The system is released from rest with the string taut and B descends.

- (a) Find the tension in the string as B descends. (9)

On hitting the ground, B immediately comes to rest.

Given that A comes to rest before reaching the pulley,

- (b) find, in terms of h , the range of possible values of d . (7)

- (c) State one physical factor, other than air resistance, that could be taken into account to make the model described above more realistic. (1)

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Question 8 continued

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Question 8 continued

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Q8

(Total 17 marks)

TOTAL FOR PAPER: 75 MARKS

END

