



Interactive Example Candidate Responses

Paper 4 (May / June 2016), Question 2

Cambridge IGCSE™
Physics 0625



In order to help us develop the highest quality resources, we are undertaking a continuous programme of review; not only to measure the success of our resources but also to highlight areas for improvement and to identify new development needs.

We invite you to complete our survey by visiting the website below. Your comments on the quality and relevance of our resources are very important to us.

www.surveymonkey.co.uk/r/GL6ZNJB

Would you like to become a Cambridge International consultant and help us develop support materials?

Please follow the link below to register your interest.

www.cambridgeinternational.org/cambridge-for/teachers/teacherconsultants/

Copyright © UCLES 2017

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

UCLES retains the copyright on all its publications. Registered Centres are permitted to copy material from this booklet for their own internal use. However, we cannot give permission to Centres to photocopy any material that is acknowledged to a third party, even for internal use within a Centre.

2 Fig. 2.1 shows a hammer being used to drive a nail into a piece of wood.

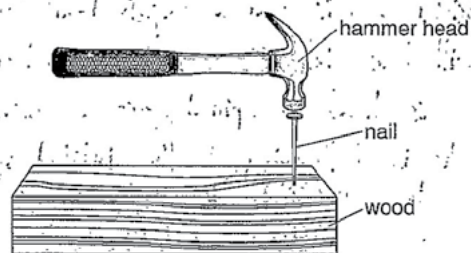


Fig. 2.1

The mass of the hammer head is 0.15 kg.

The speed of the hammer head when it hits the nail is 8.0 m/s.

The time for which the hammer head is in contact with the nail is 0.0015 s.

The hammer head stops after hitting the nail.

(a) Calculate the change in momentum of the hammer head.

$$\begin{array}{l} \text{mass} \times \text{velocity} - \text{mass} \times \text{velocity} \\ 0.15 \times 8 \quad \quad \quad 0.15 \times 0 \\ 1.2 \text{ kg m/s} \quad \quad \quad 0 \text{ kg m/s} \\ 1.2 - 0 = 1.2 \text{ kg m/s} \\ \text{change in momentum} = 1.2 \text{ kg m/s} \end{array} \quad [2]$$

(b) State the impulse given to the nail.

$$\text{impulse} = 1.2 \text{ N s} \quad [1]$$

(c) Calculate the average force between the hammer and the nail.

$$\begin{array}{l} \text{average force} = \frac{2 \times \text{mass} \times \text{speed}}{\text{time}} = \frac{2.4}{0.0015} \\ = \frac{2 \times 0.15 \times 8}{0.0015} \\ \text{average force} = 1600 \text{ N} \end{array} \quad [2]$$

[Total: 5]

Select
page

Your
Mark

2(a)

2(b)

2(c)

Q2	Mark scheme
(a)	mv – mu OR m(v – u) OR mv OR 0.15 × 8.0 1.2 Ns or kg m/s
(b)	12 Ns or kg m/s
(c)	F = (mv – mu)/t OR F = mv/t OR impulse/t OR 1.2/0.0015 800 N OR (F =) ma OR m[(v – u)/t] OR 0.15 × 8/0.0015 800 N

- 2 Fig. 2.1 shows a hammer being used to drive a nail into a piece of wood.

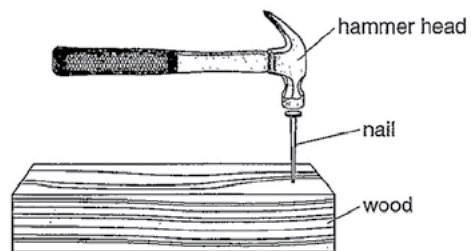


Fig. 2.1

The mass of the hammer head is 0.15 kg.

The speed of the hammer head when it hits the nail is 8.0 m/s.

The time for which the hammer head is in contact with the nail is 0.0015 s.

The hammer head stops after hitting the nail.

- (a) Calculate the change in momentum of the hammer head.

$$\begin{aligned} \text{momentum} &= \text{mass} \times \text{speed} \\ &= 0.15 \times 8 = 1.2 \text{ N/s} \\ \text{kg m/s} \end{aligned}$$

$$\text{change in momentum} = 1.2 \text{ kg m/s} \quad [2]$$

- (b) State the impulse given to the nail.

$$\begin{aligned} \text{impulse} &= \\ \text{impulse} &= 0.0015 \text{ s} \quad [1] \end{aligned}$$

- (c) Calculate the average force between the hammer and the nail.

$$\begin{aligned} F &= ma \\ &= 0.15 \times 10 \\ &= 1.5 \text{ N} \end{aligned}$$

$$\text{average force} = 1.5 \text{ N} \quad [2]$$

[Total: 5]

Select
page

Your
Mark

2(a)

2(b)

2(c)

Q2	Mark scheme
(a)	mv – mu OR m(v – u) OR mv OR 0.15 × 8.0 1.2 Ns or kg m/s
(b)	12 Ns or kg m/s
(c)	F = (mv – mu)/t OR F = mv/t OR impulse/t OR 1.2/0.0015 800 N OR (F =) ma OR m[(v – u)/t] OR 0.15 × 8/0.0015 800 N

2 Fig. 2.1 shows a hammer being used to drive a nail into a piece of wood.

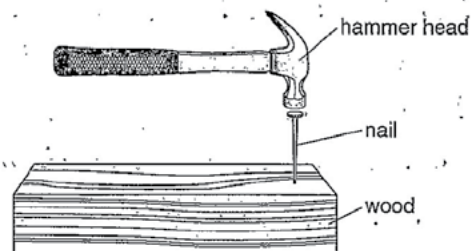


Fig. 2.1

The mass of the hammer head is 0.15 kg.

The speed of the hammer head when it hits the nail is 8.0 m/s.

The time for which the hammer head is in contact with the nail is 0.0015 s.

The hammer head stops after hitting the nail.

(a) Calculate the change in momentum of the hammer head.

$$\begin{aligned} \text{Momentum} &= \text{Mass} \times \text{Velocity} \\ &= 0.15 \times 8.0 \\ &= 1.2 \end{aligned}$$

change in momentum = 1.2 [2]

(b) State the impulse given to the nail.

impulse = 0.0018 [1]

(c) Calculate the average force between the hammer and the nail.

$$\text{Force} = \text{Mass} \times \text{acceleration}$$

average force = [2]

[Total: 5]

Select
page

Your
Mark

2(a)

2(b)

2(c)

Q2	Mark scheme
(a)	$mv - mu$ OR $m(v - u)$ OR mv OR 0.15×8.0 1.2 Ns or kg m/s
(b)	12 Ns or kg m/s
(c)	$F = (mv - mu)/t$ OR $F = mv/t$ OR impulse/t OR $1.2/0.0015$ 800 N OR $(F =) ma$ OR $m[(v - u)/t]$ OR $0.15 \times 8/0.0015$ 800 N

Cambridge Assessment International Education
The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA, United Kingdom
t: +44 1223 553554
e: info@cambridgeinternational.org www.cambridgeinternational.org

Copyright © UCLES September 2017