AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



MARK SCHEME

4.5.2 WORK DONE AND ENERGY TRANSFER (PACK 3)

SCORE	PERCENTAGE
/33	%

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Q1.

(a) equal to

1

(b) weight = 85 × 9.8

1

weight = 833 (N)

allow weight = 830 (N)

1

*an answer of 833 (N) **or** 830 (N) scores **2** marks*

(c) work done = 833 × 0.63

*allow their calculated value from part **(b)** × 0.63*

1

work done = 525 (J)

*allow an answer that is consistent with their calculated value from part **(b)***

1

*an answer that rounds to 525 (J) scores **2** marks*

(d) work done = 0 (J)

1

(e) force = 62 × 11

1

force = 682 (N)

allow force = 680 (N)

1

*an answer of 682 (N) **or** 680 (N) scores **2** marks*

[8]

Q2.

(a) distance = 2.4 m/s × 4.5 s

1

distance = 10.8 (m)

*an answer of 10.8 m scores **2** marks*

1

(b) It started going uphill.

1

(c) **D**

1

the line has the largest gradient

allow it is steepest

allow it travels the furthest distance in the shortest amount of time

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1

(d) any **two** from:

- the data logger records time more accurately
- the data logger can take readings more frequently
- there is less chance for human error when using a data logger
- the data logger automatically records data

allow the converse of each argument, eg there is a human reaction time error when using a stopclock

2

(e) air resistance

1

(f) acceleration is zero

1

because the resultant force is zero

allow because the forward force equals the air resistance

there is too much air resistance is insufficient

1

(g) $v^2 - u^2 = 2as$

$1.5^2 (- 0^2) = 2 \times a \times 2$

1

$$a = \frac{1.5^2}{2 \times 2}$$

1

$a = 0.56(25)\ m/s^2$

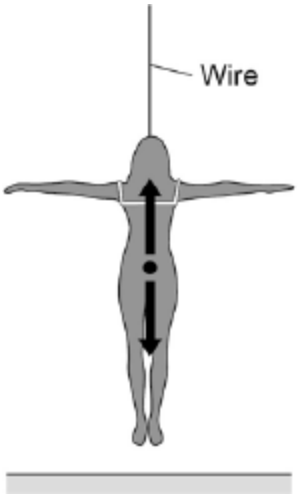
*an answer of 0.56(25) (m/s^2) scores **3** marks*

1

[13]

Q3.

(a)



arrow pointing vertically upwards

1

arrow pointing vertically downwards

1

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(b) Gravitational force

*if more than **two** boxes ticked apply list principle*

1

Tension force

1

(c) 0 (N)

1

(d) weight = 70 × 9.8 (= 686)

1

weight = 690 (N)

1

*allow 690 (N) with no working shown for **2** marks*
*allow 686 (N) with no working shown for **1** mark*

(e) 34 (N) / 30 (N)

allow ecf from 05.4 correctly calculated

1

(f) resultant force = mass × acceleration

accept F = ma

1

accept equation correctly rearranged for a

(g) 25 = 65 × a

1

a = 25 / 65

1

a = 0.38(4615…) (m / s^2)

1

*allow 0.38 (m / s^2) with no working for **3** marks*

[12]

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Q1.

(a) Only 21% identified the downwards force of the man on the bar as being equal to the upwards force of the bar on the man. Many believed it to be more than.

(b) Nearly 90% of students were able to substitute the correct numbers into the given equation and calculate the correct value of weight.

(c) 68% took their answer from part **(b)** and multiplied by 0.63 m to obtain the correct answer for work done. Many incorrect answers were given when students used 9.8 N/kg × 0.63 m and a significant minority multiplied the part **(b)** by 0.32 m.

(d) Just over 40% demonstrated they understood that when the man was not moving the work done would be 0 J. Many put in their calculated values from other parts of the question.

(e) 85% gained two marks with most students able to substitute the correct numbers into the equation given.

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