AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



MARK SCHEME

4.5.6.2.3 NEWTON'S THIRD LAW (PACK 1)

SCORE	PERCENTAGE
/26	%

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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) the forces of the bike on the trailer and the trailer on the bike are equal in size

allow the force of tension acts on the bike and the trailer

1

and opposite in direction

1

(b) any **two** from:

- the same trailer should be used
- the weather conditions should be the same

  allow a description of this, eg the wind should be the same
- the same road (surface) should be used
- the same gradient road should be used
- the same speed should be used
- the cyclist should be at the same level of alertness throughout the experiment

  allow a description of a cause of this eg the cyclist should not

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drink coffee between experiments

2

(c) straight line drawn above the original line, sloping upwards

1

(d) the cyclist's reaction time increased

1

so the thinking distance increased

1

stopping distance is thinking distance plus braking distance

1

[8]

Q3.

(a) acceleration = change in velocity / time taken

allow $a = \Delta v / t$

1

(b) $= \frac{(3 - 5)}{6}$

1

–0.33 (m / s^2)

1

*allow 0.33 m / s^2 with no working shown for **2** marks*

(c) force = mass × acceleration

allow $F = m\ a$

1

(d) 70 × 0.33

allow ecf from 4.3

1

23.1 (N)

*allow 23.1 with no working shown for **2** marks*

1

(e) before throwing the bag the momentum of the skater and bag is zero

1

when it is thrown the bag has momentum forwards

1

because momentum before = momentum after

1

the skater has equal backwards momentum so will move backwards

1

[10]

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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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