Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

(a) momentum = mass × velocity
allow p = mv
1

(b) 200 = m × 3.2
1

$$m = \frac{200}{3.2}$$
1

m = 63 (kg)
allow 62.5 (kg)
1

*an answer of 63 (kg) scores **3** marks*

(c) (total) momentum before (collision) = (total) momentum after (collision)
1

either
momentum of skater A decreases and momentum of skater B increases
allow (total) momentum is shared between skater A and skater B
1

velocity of skater A decreases and velocity of Skater B increases
1

or
momentum of skater A decreases and so velocity of skater A decreases (1)

momentum of skater B increases and so velocity of skater B increases (1)

[7]

Q2.

(a) D
allow 20 (N)
allow fourth (newtonmeter)
1

needs the greatest force to extend the spring the same amount
reason only scores if correct newtonmeter selected
1

Downloaded from www.merit-minds.com

(b) zero (error)

allow systematic (error)

1

any **one** from:

- record the value and subtract from readings taken

  allow subtract 1 from all readings)

- adjust the newtonmeter to zero

1

(c) $4.5 \times 10^{-2} = 0.5 \times 400 \times e^2$

this mark may be awarded if the standard form value is incorrectly converted

1

$$e = \sqrt{\frac{4.5 \times 10^{-2}}{0.5 \times 400}}$$

this mark may be awarded if the standard form value is incorrectly converted

allow $e^2 = \frac{4.5 \times 10^{-2}}{0.5 \times 400}$

1

e = 0.015 (m)

this answer only

1

$2.0 = 400 \times e$

1

e = 0.005 (m)

this answer only

1

0.015 + 0.005 = 0.02 (m)

allow their initial extension + their additional extension correctly calculated

1

or

$4.5 \times 10^{-2} = 0.5 \times 400 \times e^2$ (1)

this mark may be awarded if the standard form value is incorrectly converted

$$e = \sqrt{\frac{4.5 \times 10^{-2}}{0.5 \times 400}}$$ (1)

this mark may be awarded if the standard form value is incorrectly converted

allow $e^2 = \frac{4.5 \times 10^{-2}}{0.5 \times 400}$

e = 0.015 (m) (1)

this answer only

Downloaded from www.merit-minds.com

F = 400 × 0.015

F = 6 (N) (1)

allow an answer of 400 × their calculated value of e

total force = 6 + 2

8 = 400 × e (1)

allow an answer that is consistent with their calculated value of e

e = 0.02 (m) (1)

*an answer of 0.02 (m) gains **6** marks*

[10]

Downloaded from www.merit-minds.com