Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Mark Schemes

Q1.

(a) hold thumb first finger and second finger (of left hand) at right angles to each other
allow first two fingers/index and middle for first and second finger throughout
1

second finger represents the current pointing out of the paper
1

first finger represents the field pointing downwards
1

thumb points in the direction of the force / thrust / acceleration
1

(therefore) the rod moves left to right
allow correct description (eg away from the magnet)
dependent on scoring marking point 3 or 4
1

(b) decrease the resistance of the variable resistor
allow increase the current/pd
1

use a stronger magnet
allow use a magnet with a greater flux density
1

(c) $F = 0.30 \times 1.7 \times 0.050$
1

$F = 0.0255$ (N)
1

$m = 0.004(0)$ kg
1

$0.0255 = 0.0040 \times a$
this mark may be awarded if m is incorrectly / not converted and / or F is incorrectly calculated
1

$a = 0.0255 / 0.0040$
or
$a = 6.375$
this mark may be awarded if m is incorrectly / not converted

Downloaded from www.merit-minds.com

and / or F is incorrectly calculated

1

$\Delta v = 6.375 \times 0.15 = 0.95625$ (m/s)

allow a correct calculation using an incorrectly / not converted m and / or an incorrectly calculated F

allow 0.96 ***or*** *0.956 (m/s)*

1

alternative method

$F = 0.30 \times 1.7 \times 0.050$ (1)

$F = 0.0255$ (N) (1)

m = 0.004(0 kg) (1)

$$0.0255 = \frac{0.0040 \times \Delta v}{0.15} \quad (1)$$

this mark may be awarded if m is incorrectly / not converted and / or F is incorrectly calculated

$$\Delta v = \frac{0.0255 \times 0.15}{0.0040} \quad (1)$$

this mark may be awarded if m is incorrectly / not converted and / or F is incorrectly calculated

$\Delta v = 0.95625$ (m/s) (1)

allow a correct calculation using an incorrectly / not converted m and / or an incorrectly calculated F

allow 0.96 ***or*** *0.956 (m/s)*

[13]

Q2.

(a) any **two** correct lines drawn from the top of the visitor and passing through the lens

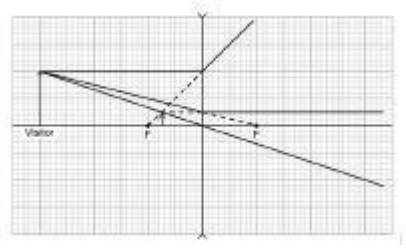
allow construction lines that are not dashed

2

image drawn at the correct position and with the correct orientation

mark only scores if first two marks scored.

a convex lens diagram scores ***0*** *marks*



1

(b) Decreases

1

(c) Iron

1

(d) there is a current in the solenoid / circuit

Downloaded from www.merit-minds.com

allow a charge flows through the solenoid / circuit

1

creating a magnetic field

allow the solenoid / coil is magnetised

1

attracting the bolt

1

(e) 1.50 cm = 0.015 m

1

2.88 = k × 0.015

this mark may be awarded if distance is incorrectly/not converted

1

k = 2.88 / 0.015

this mark may be awarded if distance is incorrectly/not converted

1

k = 192 (N/m)

allow a correctly calculated answer using an incorrectly/not converted distance

1

(f) Any **two** from:

- increase the current (in the solenoid / circuit)

  *allow any sensible suggestion for increasing the current such as increasing the p.d. / power of the battery **OR** using lower resistance wire in the solenoid*

- add more turns to the solenoid

  *do **not** allow increase the number of coils*

- use a spring with a lower spring constant

  allow use a weaker spring

2

[14]

Downloaded from www.merit-minds.com