

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

An engineering company has invented pavement tiles that generate electricity as people walk on them.

The figure below shows someone walking on the pavement tiles.



Use the Physics Equations Sheet to answer parts (a) and (b).

(a) What equation links current (I), potential difference (V) and power (P)?

Tick (✓) **one** box.

$P = \frac{V}{I}$

$P = V \times I$

$I = P \times V$

$V = I^2 \times P$

(1)

(b) When a person walks on a tile, a potential difference of 40 V is induced across the tile.

The power output of the tile is 4.4 W.

Calculate the current in the tile.

Current = _____ A

(3)

Use the Physics Equations Sheet to answer parts (c) and (d).

(c) What equation links efficiency, total power input and useful power output?

Tick (✓) **one** box.

Efficiency = $\frac{\text{useful power output}}{\text{total power input}}$

Efficiency = $\frac{\text{total power input}}{\text{useful power output}}$

Efficiency = useful power output \times total power input

(1)

(d) The tiles are used to power LED lights in the pavement.

An LED light has a total power input of 4.0 W.

The efficiency of the LED light is 0.85

Calculate the useful power output of the LED light.

Useful power output = _____ W

(3)

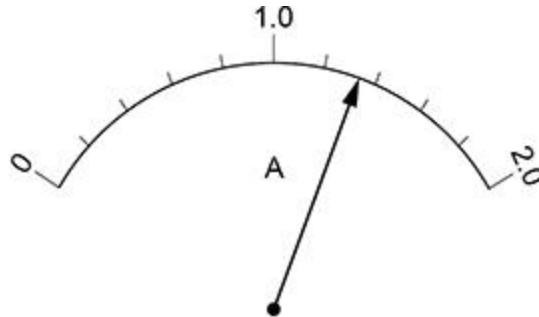
(Total 8 marks)

Q2.

(2)

Figure 2 shows the scale on a moving coil ammeter at one time in the investigation.

Figure 2



(c) What is the resolution of the moving coil ammeter?

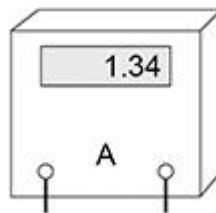
Resolution = _____ A

(1)

(d) Student B replaced the moving coil ammeter with a digital ammeter.

Figure 3 shows the reading on the digital ammeter.

Figure 3



The digital ammeter has a higher resolution than the moving coil ammeter.

Give **one** other reason why it would have been better to use the digital ammeter throughout this investigation.

(1)

(Total 10 marks)