Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Mark Schemes

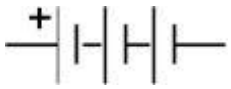
Q1.

(a) correct circuit symbol

1

3 cells joined in series in correct orientation

e.g.



ignore absence of + symbol

1

(b) $R = \frac{12}{1.6}$

1

R = 7.5 (Ω)

1

*an answer of 7.5 (Ω) scores **2** marks*

(c) 4.0 (Ω)

*allow their answer to part **(b)** − 3.5 correctly calculated*

1

(d) it decreases

1

the current would be higher (for the same p.d.)

reason only scores if correct box is chosen

or
more than one path for charge to flow

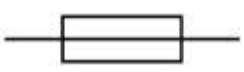
allow current for charge

or
total resistance is always less than the smallest individual resistance

1

[7]

Q2.

(a) 

1

(b) E = 13 × 230

1

E = 2990 (J)

1

*an answer 2990 (J) scores **2** marks*

(c) charge flow = current × time

allow Q = It

1

(d) 1.52 = I × 0.40

1

$$I = \frac{1.52}{0.40}$$

1

I = 3.8 (A)

1

*an answer of 3.8 (A) scores **3** marks*

(e) E = 0.00175 × 205 000

1

E = 359 (J)

*allow an answer that rounds to 360 (J) for **2** marks*

1

*an answer of 359 (J) scores **2** marks*

[9]

Q3.

(a) $$P = \frac{120\,000}{8.0}$$

1

P = 15 000 (W)

1

*an answer of 15 000 (W) scores **2** marks*

(b) energy is transferred in heating the surroundings

1

friction causes energy to be transferred in non-useful ways

1

(c) the switches are in parallel

1

(so) closing either switch completes the circuit

1

(d) gravitational potential energy = mass × gravitational field strength × height

allow $E_p = m\ g\ h$

1

(e) E_p = 280 × 9.8 × 14

1

E_p = 38 416 (J)

1

E_p = 38 000 (J)

*an answer that rounds to 38 000 scores **2** marks*

1

*an answer of 38 000 scores **3** marks*

[10]