

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

(a) $5.75 = I \times 230$

1

$$I = \frac{5.75}{230}$$

1

$$I = 0.025 \text{ (A)}$$

1

$$230 = 0.025 \times R$$

or

$$R = \frac{230}{0.025}$$

*allow a correct substitution using an incorrect value of I***or***allow a correct rearrangement using incorrect value of I*

1

$$R = 9200 \text{ (}\Omega\text{)}$$

*allow a correct calculation of resistance using an incorrect value of I**alternative approach for 4th and 5th marks:*

$$5.75 = 0.025^2 \times R \text{ (1)}$$

or

$$R = \frac{5.75}{0.025^2}$$

$$R = 9200 \text{ (}\Omega\text{)} \text{ (1)}$$

alternative approach:

$$5.75 = \frac{230^2}{R} \text{ (3)}$$

$$R = \frac{230^2}{5.75} \text{ (1)}$$

$$R = 9200 \text{ (}\Omega\text{)} \text{ (1)}$$

1

(b) one wire in the switch is live

allow the switch / circuit is live allow one wire is at a potential of 230 V

1

the electrician is earthed
or
the electrician is at earth potential

1

(so) there will be a (large) potential difference between the live wire and the electrician / earth (if the electrician touched the wire)

1

(c) 50 Hz has the lowest (maximum) let-go current

1

a higher / lower / different frequency would allow people to let go at a greater current
allow a specific numerical example as opposed to a trend

1

[10]

Q2.

(a) 50

1

Hz / hertz

allow Hertz

1

(b) (both) switches need to be closed / on

1

to complete the series circuit

or

to allow charge to flow

or

so there is a current in the circuit

1

(c)

an answer of 7.5 (A) scores 3 marks

an answer of 0.237(A) scores 2 marks

$$1800 = I^2 \times 32$$

this mark may be awarded if P is incorrectly or not converted

1

$$I^2 = \frac{1800}{32}$$

or

$$I^2 = 56.25$$

this mark may be awarded if P is incorrectly or not converted

1

$$I = 7.5 \text{ (A)}$$

this answer only

1

(d)

an answer of 300 (s) scores 3 marks

an answer of 300 000 (s) scores **2** marks

$$1500 = \frac{450\,000}{t}$$

this mark may be awarded if P is incorrectly or not converted

1

$$t = \frac{450\,000}{1500}$$

this mark may be awarded if P is incorrectly or not converted

1

$$t = 300 \text{ (s)}$$

this answer only

1

[10]