

Interactive Example Candidate Responses

Paper 4 (May / June 2016), Question 8

Cambridge IGCSE™
Physics 0625



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- 8 (a) Fig. 8.1 shows 3 lamps and a fuse connected to a power supply.

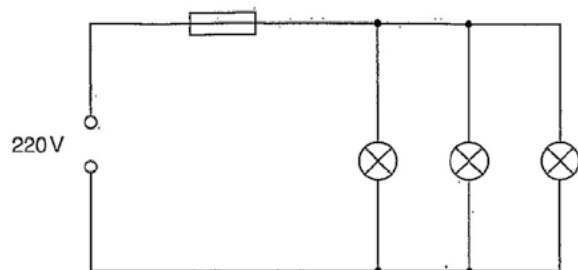


Fig. 8.1

The e.m.f. of the supply is 220V. Each lamp is labelled 220V, 40W. The rating of the fuse is 2.0A.

Calculate

- (i) the current in each lamp,

$$\text{Current} = \frac{\text{Power}}{\text{Voltage}}$$

$$I = \frac{P}{V} \\ = \frac{40}{220} \\ = 0.18$$

$$\text{current} = 0.18 \text{ A} \quad [2]$$

- (ii) the current in the fuse,

Total current in circuit:

$$\frac{3 \times 40}{220} \\ = 0.55 \text{ A}$$

Fuse current = total lamps

$$= 0.55 \text{ A} - (3 \times 0.18) \\ = 0.55 - 0.54 \\ = 0.01$$

$$\text{current} = 2 \text{ A} \quad [1]$$

- (iii) the total number of lamps, all in parallel, that could be connected without blowing the fuse.

$$\text{Total number of lamps} = \frac{\text{Current in fuse}}{\text{Current of lamp}} \\ = \frac{2}{0.18} = 11.11$$

$$\text{number} = 11 \quad [2]$$

Select
page

Your
Mark

8(a)(i)

8(a)(ii)

8(b)(i)

8(b)(ii)

8(b)(iii)

Q8	Mark scheme
(a)(i)	$P = IV$ OR $40 = 220 \times I$ OR $(I =) P/V$ OR $40/220$ 0.18A
(a)(ii)	$[3 \times 0.18(2)] = 0.54 \text{ A}$ OR 0.55A
(a)(iii)	$2/0.182 = 10.99$ OR $2/0.18 = 11.1$ 10 lamps OR 11 lamps
(b)(i)	resistance <u>increases</u>
(b)(ii)	Power (of lamp) decreases $P = IV$ and current in lamp decreases. OR $P = V^2/R$

(b) After a very long period of use, the wire filament of one of the lamps becomes thinner.

(i) Underline the effect of this change on the resistance of the filament.

resistance increases resistance remains the same. resistance decreases [1]

(ii) State and explain the effect of this change on the power of the lamp.

The power of the lamp would decrease. This is
due to decrease in current. The current is decreased
due to the increase in resistance. [2]

[Total: 8]

Your
Mark

8(a)(i)

8(a)(ii)

8(b)(i)

8(b)(ii)

8(b)(iii)

Q8	Mark scheme
(a)(i)	$P = IV$ OR $40 = 220 \times I$ OR $(I =) P/V$ OR $40/220$ 0.18 A
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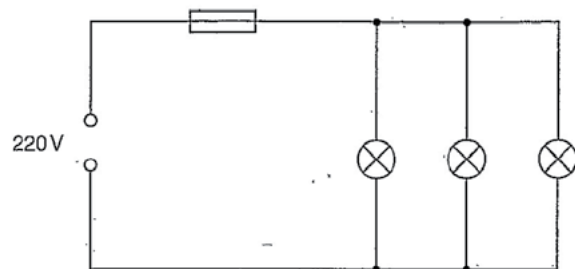


Fig. 8.1

The e.m.f. of the supply is 220V. Each lamp is labelled 220V, 40W. The rating of the fuse is 2.0A.

Calculate

- (i) the current in each lamp,

$$P = VI,$$

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

$$\frac{40}{220} = 0.18$$

current = 0.18 A [2]

- (ii) the current in the fuse,

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

$$I = \frac{440}{40} = 11$$

current = 11 A [1]

- (iii) the total number of lamps, all in parallel, that could be connected without blowing the fuse.

number = 61 [2]

Select
page

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Mark

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8(a)(ii)

8(b)(i)

8(b)(ii)

8(b)(iii)

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(b) After a very long period of use, the wire filament of one of the lamps becomes thinner.

(i) Underline the effect of this change on the resistance of the filament.

resistance increases resistance remains the same resistance decreases [1]

(ii) State and explain the effect of this change on the power of the lamp.

$P = \frac{V^2}{R}$ This formula determines that
resistance is inversely proportional to
power so therefore if ^{power} P is doubled then [2]
resistance is halved. [Total: 8]

Your
Mark

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8(a)(ii)

8(b)(i)

8(b)(ii)

8(b)(iii)

Q8	Mark scheme
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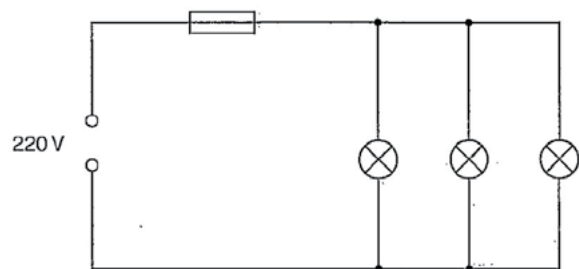


Fig. 8.1

The e.m.f. of the supply is 220V. Each lamp is labelled 220V, 40W. The rating of the fuse is 2.0A.

Calculate

- (i) the current in each lamp,

$$P = IV$$

$$40 = I \times 220$$

$$\therefore \frac{220}{40} = 5.5$$

$$\text{current} = \dots\dots\dots 5.5 \dots\dots\dots [2]$$

- (ii) the current in the fuse,

$$\underline{279}$$

$$\text{current} = \dots\dots\dots 110 \dots\dots\dots [1]$$

- (iii) the total number of lamps, all in parallel, that could be connected without blowing the fuse,

$$\text{number} = \dots\dots\dots 2 \dots\dots\dots [2]$$

Select
page

Your
Mark

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(b) After a very long period of use, the wire filament of one of the lamps becomes thinner.

(i) Underline the effect of this change on the resistance of the filament.

resistance increases resistance remains the same resistance decreases [1]

(ii) State and explain the effect of this change on the power of the lamp.

The resistance increases ~~so~~ so the
power of the lamp will decrease.
[2]

[Total: 8]

Your
Mark

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8(a)(ii)

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