Mark schemes

1 (a) V = 0.10 × 45

1

4.5 (V)

1

(b) R = 12 / 0.10

1

total resistance = 120 (Ω)

1

R = 120 – 105 = 15 (Ω)

1

(c) (total) resistance decreases

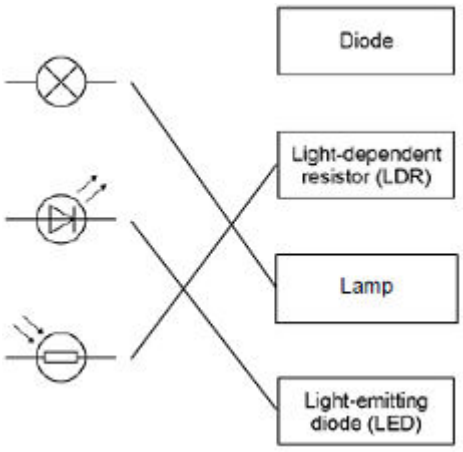
1

(so) current increases

1

[7]

2 (a)



*allow **1** mark for each correct line if more than one line is drawn from any symbol then all of those lines are wrong*

3

(b) (i) half

1

(ii) 3(V)

1

(iii) V_1

1

(c) (i) potential difference / voltage of the power supply

accept the power supply

accept the voltage / volts

accept number of cells / batteries

accept (same) cells / batteries

do not accept same ammeter / switch / wires

1

(ii) bar drawn – height 1.(00)A

ignore width of bar

*allow **1** mark for bar shorter than 3rd bar*

2

(iii) as the number of resistors increases the current decreases

1

[10]

3 (a) 35

*an answer with more than 2 sig figs that rounds to 35 gains **2** marks*

*allow **2** marks for correct method, ie* $\frac{230}{6.5}$

*allow **1** mark for I = 6.5 (A) **or** R =* $\frac{230}{26}$

*an answer 8.8 gains **2** marks*

*an answer with more than 2 sig figs that rounds to 8.8 gains **1** mark*

3

(b) (maximum) current exceeds maximum safe current for a 2.5 mm^2 wire

accept power exceeds maximum safe power for a 2.5 mm^2 wire

or

(maximum) current exceeds 20 (A)

(maximum) current = 26 (A) is insufficient

1

a 2.5 mm^2 wire would overheat / melt

accept socket for wire

*do **not** accept plug for wire*

1

(c) a.c. is constantly changing direction

accept a.c. flows in two directions

accept a.c. changes direction

a.c. travels in different directions is insufficient

1

d.c. flows in one direction only

1

[7]

4 (a) (i) 6

1

(ii) variable resistor

1

(iii) voltmeter

1

(b) (i) point at 3 V ringed

1

(ii) The student misread the ammeter.

1

(iii) 1 (volt)

accept every volt

1

(c) as one increases so does the other

or

directly proportional

or

positive correlation

accept a numerical description, eg when one doubles the other also doubles

1

[7]