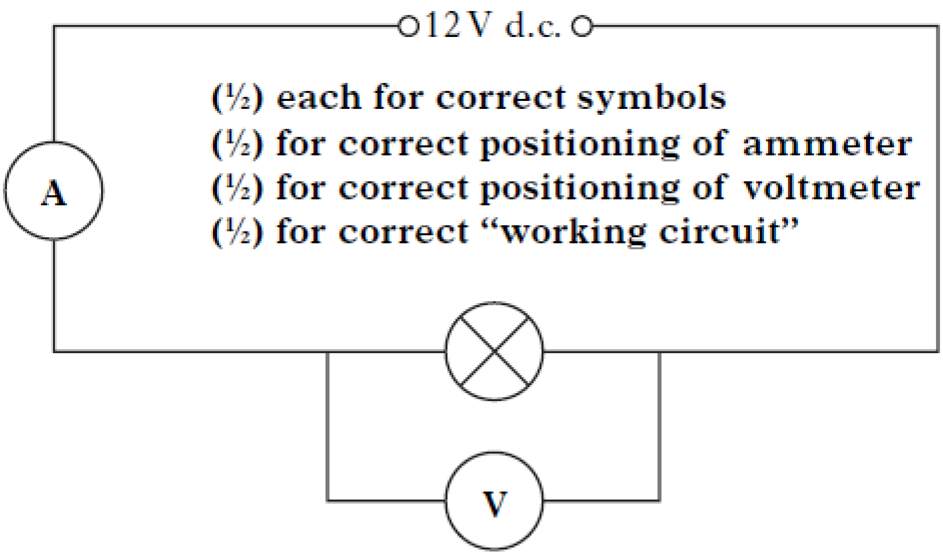
Electricity 2 Answers – NAT 5

1) a) 2116Ω.

b) 529Ω.

2) a)



b) Resistance.

c) i)

I(A)	V(V)	R(Ω)	IV	I^2R
2	12	6	**24**	**24**

ii) Power.

iii) Watts.

3) a) The mats are connected in parallel.

b) 1.3A.

c) Resistance of each mat = 177Ω.

Total resistance of the three mats in parallel = 59Ω.

4) a) 0.19A. (0.1875A)

b) 1.5V.

c) The current flowing in the circuit would decrease.

The voltage dropped across the 8Ω resistor would also decrease from V= IR.

5) a) i) 3A.

ii) 24V.

iii) 8Ω.

b) i) 1.5Ω.

ii) A) The reading on the ammeter decreases.

B) When the variable resistor is removed, the total resistance in the circuit increases.

As the resistance increases, the current flowing decreases.

6) a) 0.26A.

b) i) 30.7Ω.

ii) 1723W.

iii) **S3 only**. This element has the largest resistance, so the current flow through this element would be low, giving it a low power.

7) a) 0.6A.

b) 5Ω.

c) 2.5Ω.

d) 10Ω.

e) i) The reading on the ammeter will decrease.

ii) When a lamp is removed from the parallel set up, the resistance will increase.

As the resistance increases, the current flow will decrease.

8) a) 72W.

b) i) 24.2kWh.

ii) £3.63.

9) a) **Lamp A** as it has a lower resistance.

A lower resistance means a higher current and also a higher power rating.

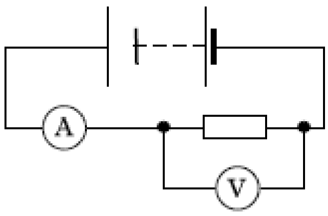
b) 230W.

c)

d) i) 12V.

ii) 6Ω.

10) a)



b) 9.5Ω.

c) Power developed in the resistor is calculated as 3.42W. The power developed is greater than the labelled power rating, so it overheats.

d) **No**.

In parallel the voltage across each resistor is still the same, so the power will still be the same.

11) a) **dc** – the electrons flow around the circuit in one direction only. (from –ve to +ve)

ac – the electrons change direction every half cycle.

b) i) ac.

ii) 15W.

12) a) i) 56.3Ω.

ii) The resistance stays the same as the gradient of the graph of **I** against **V** is const.

The ratio of V/I for any of the plotted points will be the same, so R is constant.

b) i) 270Ω + 390Ω = 660Ω.

ii) 33Ω and 56Ω in parallel gives a total resistance = 20.8Ω.

13) a) 0.2A.

b) i) 20Ω.

ii) 60Ω - >1.35W.

30Ω -> 2.70W.

iii) The 30Ω resistor will overheat as it has more current flowing through it, with more power developed in it.

c) No difference.

14) 7.5Ω.

15) a) 2 Ω.

b) 6A.