1 Fig. 8.1 shows a 240 V a.c. mains circuit to which a number of appliances are connected and switched on.
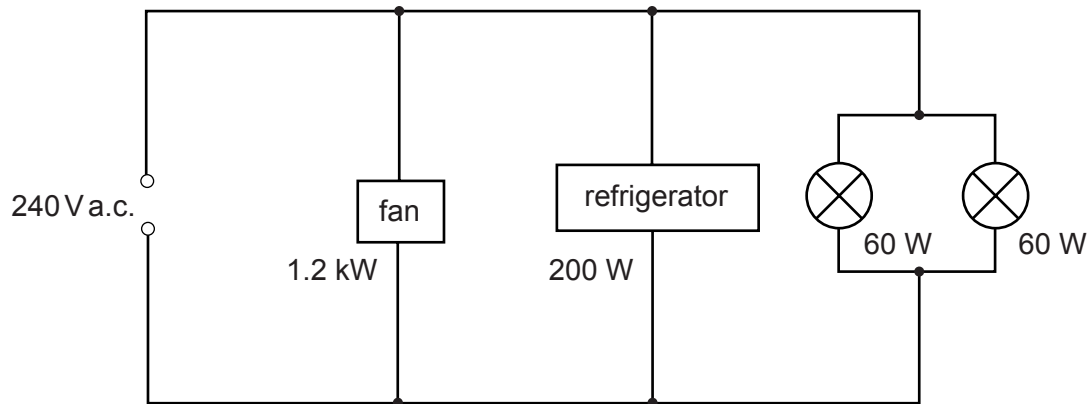

Fig. 8.1

(a) Calculate the power supplied to the circuit.

power = …………..[1]

(b) The appliances are connected in parallel.

(i) Explain what connected *in parallel* means.

....

....

(ii) State two advantages of connecting the appliances in parallel rather than in series.

advantage 1 ....

advantage 2 ....

[3]

(c) Calculate

    (i) the current in the refrigerator,

current = …………..

    (ii) the energy used by the fan in 3 hours,

energy = …………..

    (iii) the resistance of the filament of one lamp.

resistance = …………..

[Total : 11]

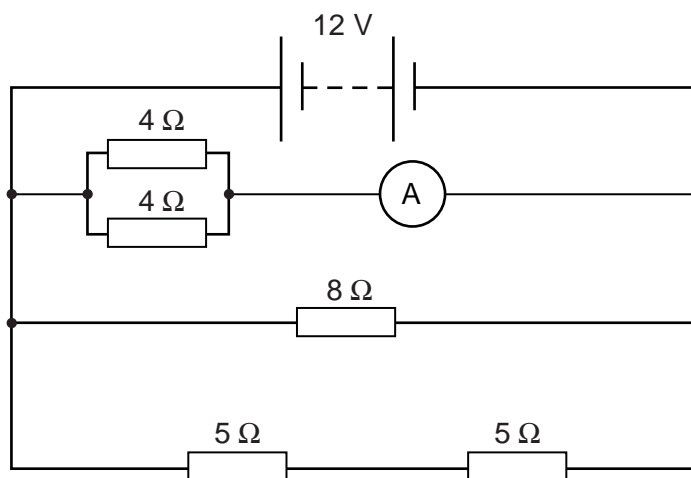**2** Fig. 7.1 shows a 12 V battery connected to a number of resistors.

Fig. 7.1

(a) Calculate the current in the 8 Ω resistor.

current = ………………..[2]

(b) Calculate, for the resistors connected in the circuit, the combined resistance of

(i) the two 5 Ω resistors,

resistance = ………………..

(ii) the two 4 Ω resistors.

resistance = ………………..
[2]

(c) The total current in the two 4 Ω resistors is 6 A.
Calculate the total power dissipated in the two resistors.

power = ………………..[2]

(d) What will be the reading on a voltmeter connected across

   (i) the two 4 Ω resistors,

reading = ………………..

   (ii) one 5 Ω resistor?

reading = ………………..

[2]

(e) The 8 Ω resistor is made from a length of resistance wire of uniform cross-sectional area.
State the effect on the resistance of the wire of using

   (i) the same length of the same material with a greater cross-sectional area,

   ....

   (ii) a smaller length of the same material with the same cross-sectional area.

   ....

[2]

[Total : 10]

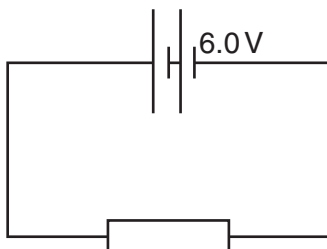**3** Fig. 8.1 shows a battery with a resistor connected across its terminals. The e.m.f. of the battery is 6.0 V.

Fig. 8.1

The battery causes 90 C of charge to flow through the circuit in 45 s.

(a) Calculate

(i) the current in the circuit,

current = ...

(ii) the resistance of the circuit,

resistance = ...

(iii) the electrical energy transformed in the circuit in 45 s.

energy = ...
[6]

(b) Explain what is meant by the term *e.m.f. of the battery*.

....

....

....[2]

[Total : 8]

4 Fig. 10.1 shows a battery with an e.m.f of 12 V supplying power to two lamps.
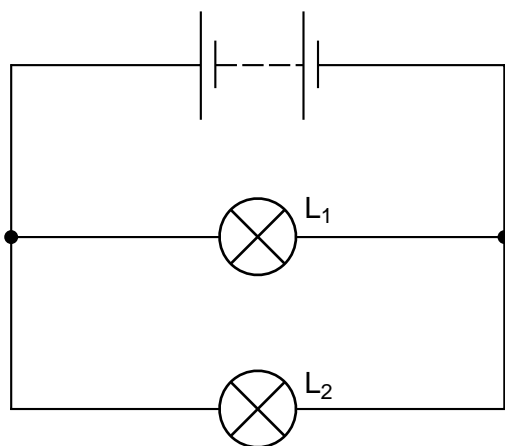
The total power supplied is 150 W when both lamps are on.

Fig. 10.1

(a) Calculate the current supplied by the battery when both lamps are on.

current = ... [2]

(b) The current in lamp L_2 is 5.0 A.

Calculate

  (i) the current in lamp L_1,

current = ...

(ii) the power of lamp L$_1$,

power = ...

(iii) the resistance of lamp L$_1$.

resistance = ...

[6]

[Total : 8

5 Fig. 7.1 shows an arrangement that could be used for making an electromagnet or a permanent magnet.
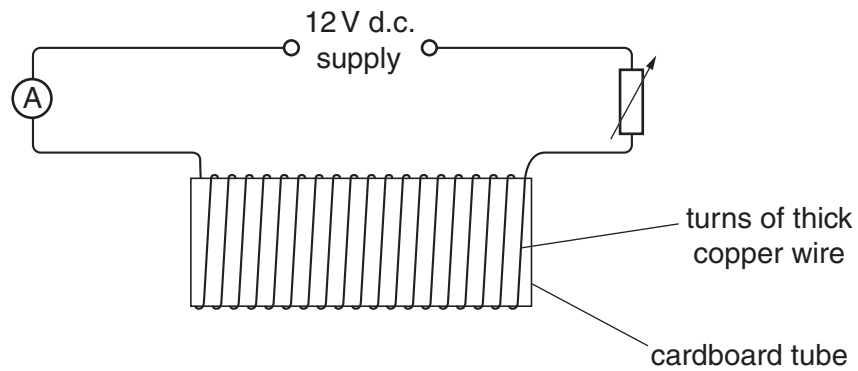

Fig. 7.1

Two bars of the same size are also available, one made of iron and the other of steel.

(a) (i) State which bar should be used to make a permanent magnet.

....

(ii) Describe how the apparatus would be used to make a permanent magnet.

....

....

....

(iii) Suggest one reason why the circuit contains an ammeter and a variable resistor.

....

....

[3]

(b) During the making of a permanent magnet, the ammeter reads a steady current of 4.0 A throughout the 5.0 s that the current is switched on. The voltage of the supply is 12 V.

Calculate

(i) the total circuit resistance,

resistance = ...

(ii) the power of the supply,

power = ...

(iii) the energy supplied during the 5.0 s.

energy = ...
[6]

(c) The potential difference across the variable resistor is 7.0 V and that across the ammeter is zero.

(i) Calculate the potential difference across the magnetising coil.

potential difference = ...

(ii) State the general principle used in making this calculation.

....

....
[3]

[Total :12]