

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

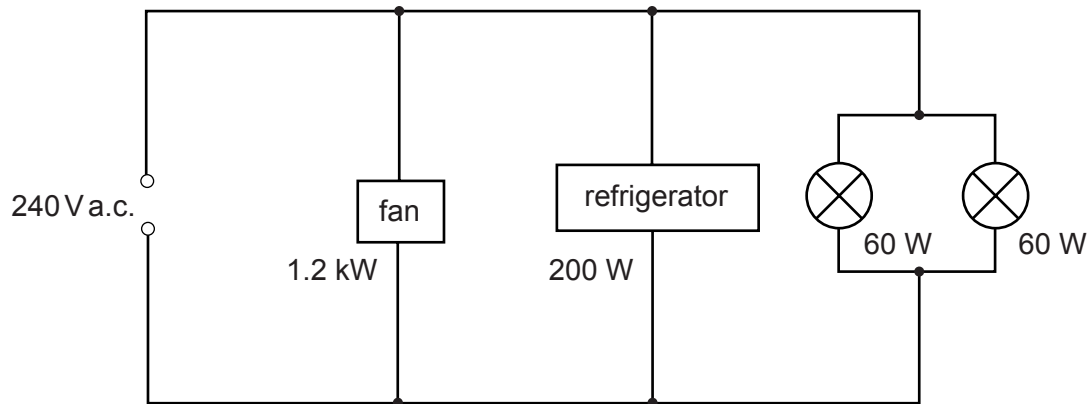


Fig. 8.1

- (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.

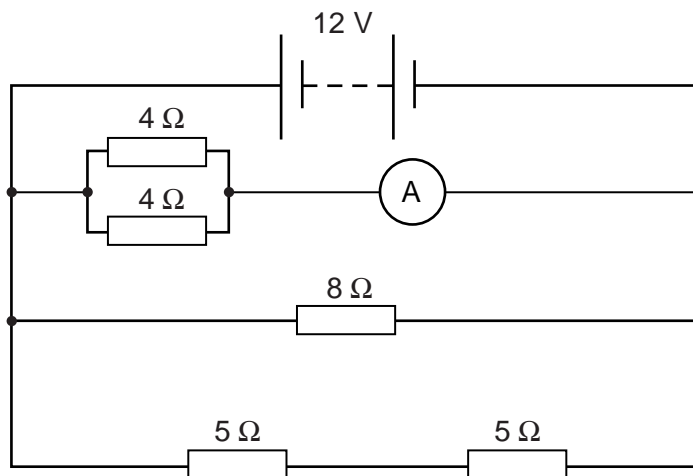


Fig. 7.1

(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 $4\ \Omega$ 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 $4\ \Omega$ resistors,

reading =

- (ii) one $5\ \Omega$ resistor?

reading =
[2]

- (e) The $8\ \Omega$ 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.

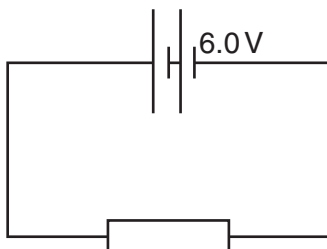


Fig. 8.1

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.

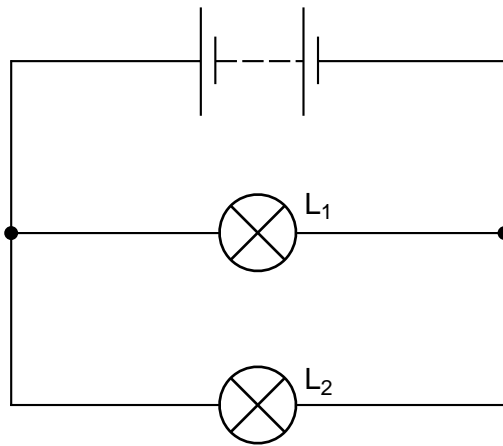


Fig. 10.1

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

current = [2]

- (b) The current in lamp L₂ is 5.0 A.

Calculate

- (i) the current in lamp L₁,

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.

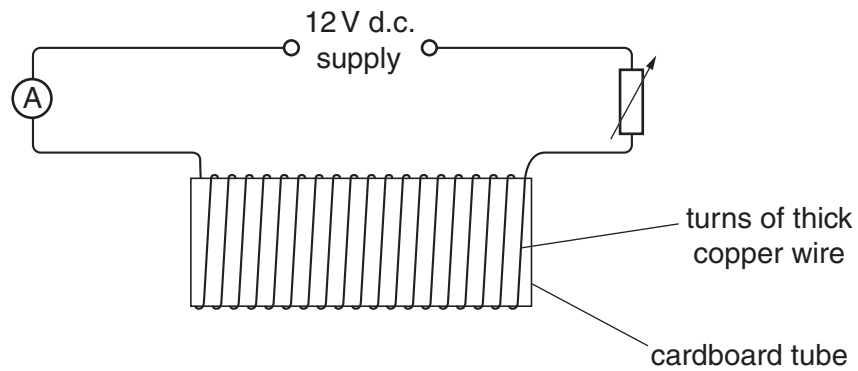


Fig. 7.1

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]