

1 The circuit shown in Fig. 10.1 uses a 12V battery.

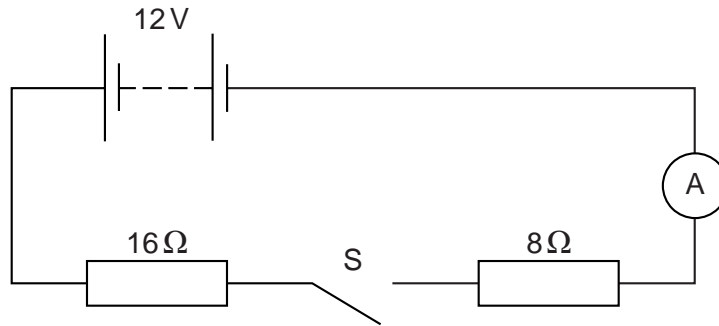


Fig. 10.1

(a) Switch S is open, as shown in Fig. 10.1.

State the value of

(i) the reading on the ammeter,

reading = [1]

(ii) the potential difference (p.d.) across S.

p.d. = [1]

(b) Switch S is now closed.

(i) Calculate the current in the ammeter.

current = [2]

(ii) Calculate the p.d. across the 8Ω resistor.

p.d. = [2]

(c) The two resistors are now connected in parallel.

Calculate the new reading on the ammeter when S is closed, stating clearly any equations that you use.

reading = [4]

[Total: 10]

2 Fig. 8.1 is the plan of a small apartment that has four lamps as shown.

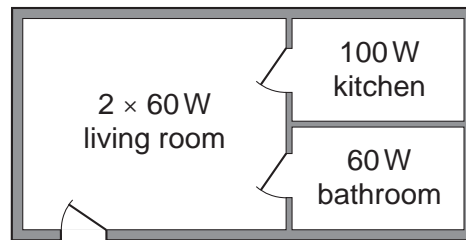


Fig. 8.1

Power for the lamps is supplied at 200V a.c. and the lamps are all in parallel.

(a) In the space below, draw a lighting circuit diagram so that there is one switch for each room and one master switch that will turn off all the lamps. Label the lamps as 60W or 100W.

[3]

(b) The 100W lamp is switched on. Calculate

(i) the current in the lamp,

current = [2]

(ii) the charge passing through the lamp in one minute.

charge = [2]

(c) The three 60W lamps are replaced by three energy-saving ones, that give the same light output but are rated at only 15W each.

Calculate

(i) the total reduction in power,

reduction in power = [1]

(ii) the energy saved when the lamps are lit for one hour.

energy saved = [2]

[Total: 10]