

CH - 11 ELECTRICITY

I. VERY SHORT ANSWER

1. How much current will an electric bulb draw from 220V source, if the resistance of the bulb is 1200Ω ? If in the place of bulb, a heater of resistance 100Ω is connected to the source. Calculate the current draw by it.

Given :

$$V = 220V \quad R_1 = 1200\Omega, \quad I_1 = ?$$

$$R_2 = 100\Omega \quad I_2 = ?$$

$$V = IR \text{ by ohm law}$$

$$V = I_1 R_1$$

$$V = I_2 R_2$$

$$I_1 = \frac{V}{R_1} = \frac{220}{1200}$$

$$= 0.18A$$

$$I_2 = \frac{V}{R_2} = \frac{220}{100}$$

$$= 2.2A$$

2. Two wires of equal lengths, one of copper and the other of manganin (an alloy) have the same thickness. Which one can be used for (i) electrical transmission lines and (ii) electrical heating devices? Why?

(i) Copper, as it has the lesser resistivity.

(ii) Manganin as it has the comparatively higher resistivity, less oxidation even at high temperature.

II SHORT ANSWER

1. A current of 1A is drawn by a filament of electric bulb. Calculate the number of electrons passing through the cross section of filament in 30 minutes.

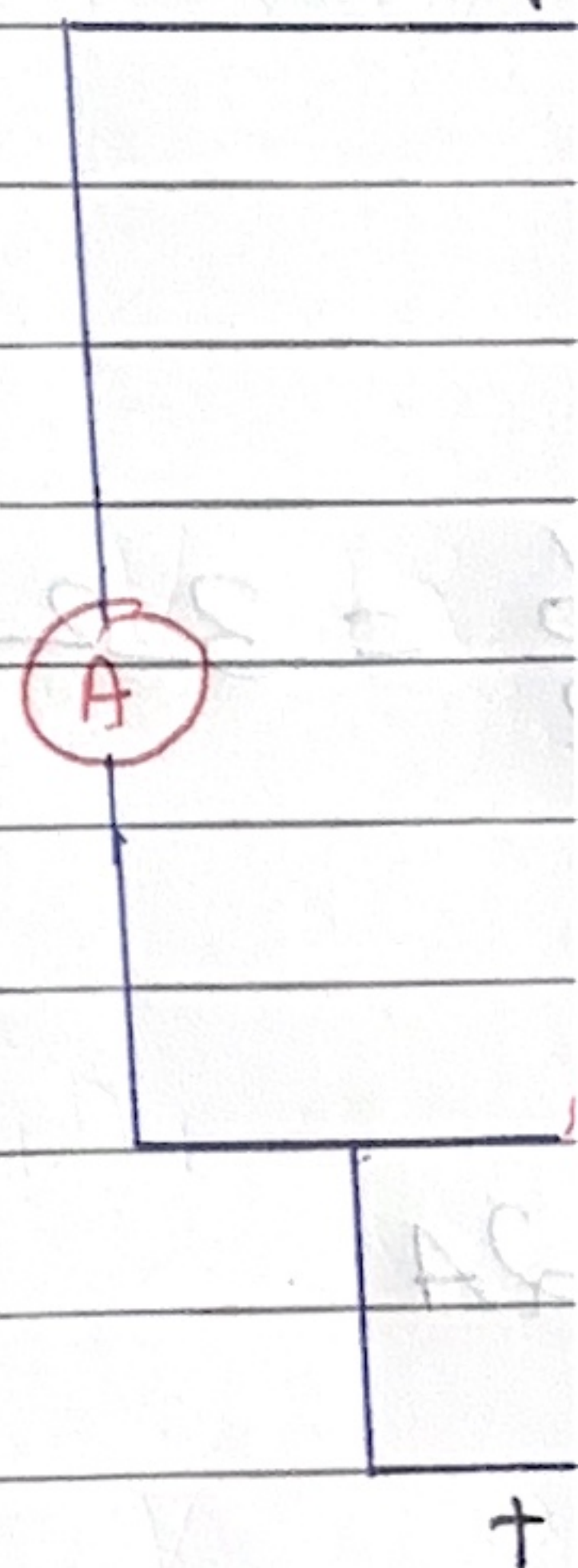
Given:

$$\begin{aligned} I &= 1A \\ t &= 30 \text{ min} \\ &= 30 \times 60 \\ &= 1800 \text{ sec} \end{aligned}$$

$$\begin{aligned} \text{Using } Q &= It \\ &= 1 \times 1800 \\ &= 1800C \end{aligned}$$

$$Q = ne$$

2) A circuit diagram given



(a) Find the

(b) Find the

(c) Find the p
the term

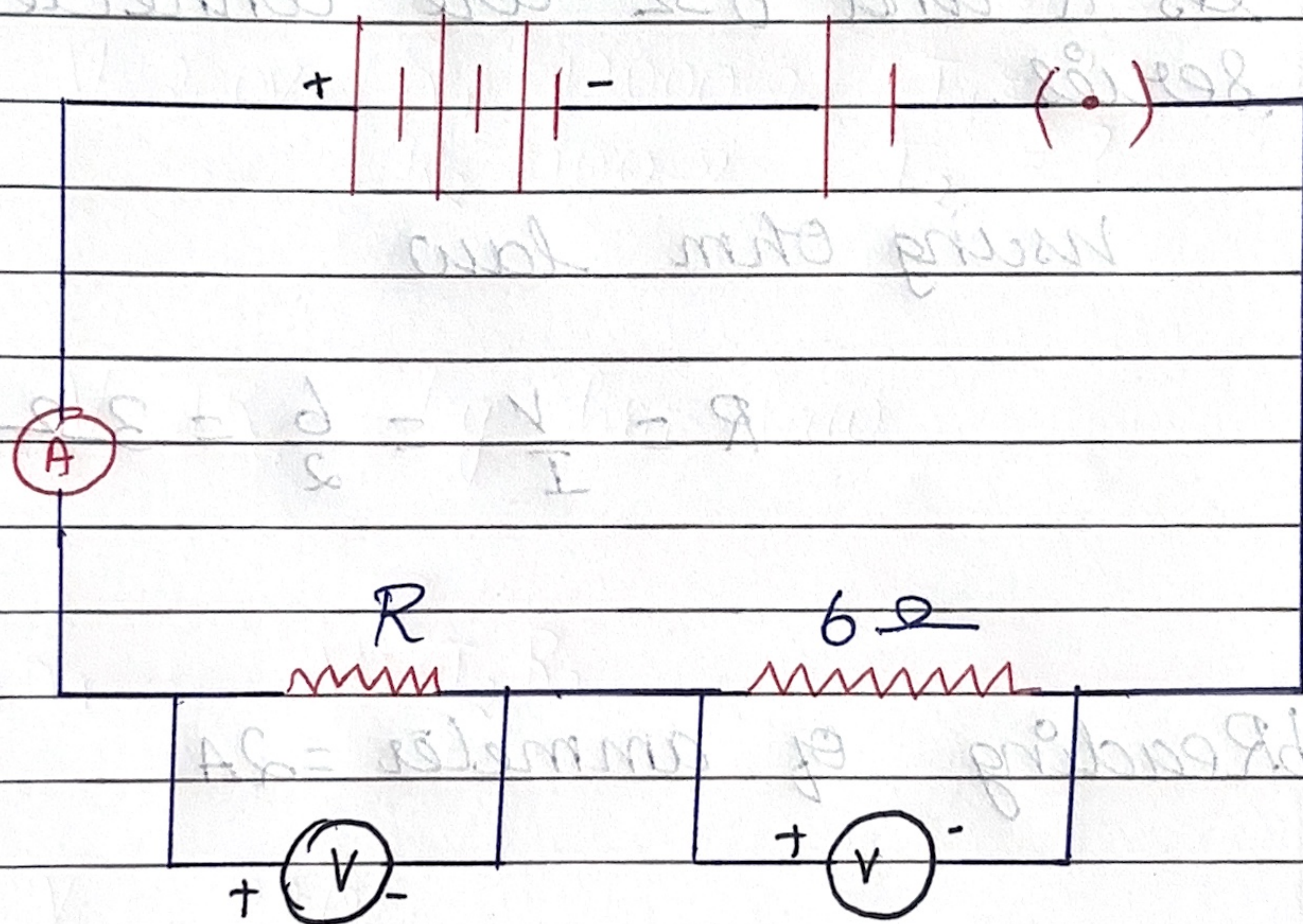
$$V = 1800 = n \times 1.6 \times 10^{-19}$$

$$n = \frac{1800}{1.6 \times 10^{-19}}$$

$$= 1125 \times 10^{19}$$

$$n = 1.125 \times 10^{22}$$

2) A circuit is shown in the diagram given below.



- Find the value of R .
- Find the reading of ammeter.
- Find the potential difference across the terminals of the battery.

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(a) potential difference across $6\Omega = 12V$

Current through 6Ω

$$I = \frac{V}{R}$$

$$= \frac{12}{6}$$

$$I = 2A$$

As R and 6Ω are connected in series.

Using Ohm law

$$R = \frac{V}{I} = \frac{6}{2} = 3\Omega$$

Reading of ammeter $= 2A$

c. p.d across the terminals of the battery

$$V = V_1 + V_2$$

$$= 6 + 12$$

$$V = 18V.$$