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Topic-Current Electricity
Lecture-01
Rishu Sir



Zinedu hai to...possible hai!



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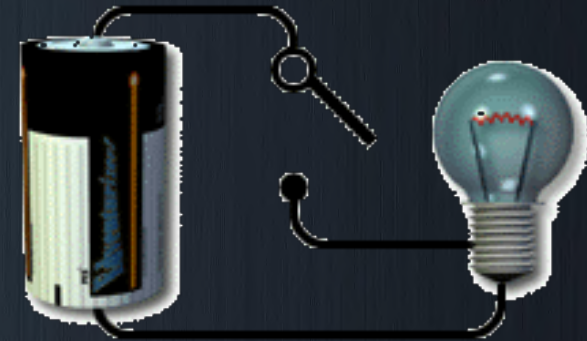


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How electricity work?



CURRENT



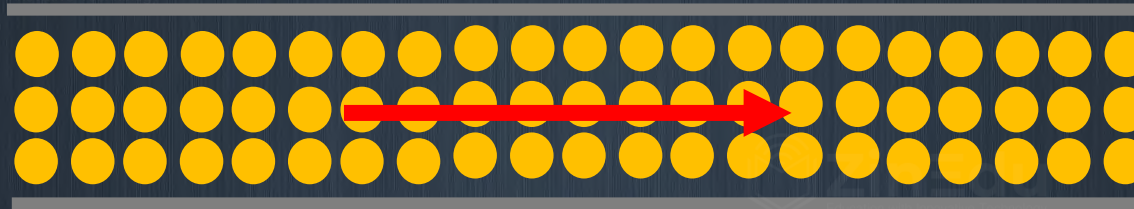
Lets understand current first



Water flow



Water current



Air flow

Air current



Electron flow

Electric current

Water flow \propto Quantity of Water
 Water Current \propto Quantity of Water



10Ltr

100Ltr t=0

Pipe: 1

t = 2sec

t = 10sec
 Water Current \propto Water Current



Water flow \propto Water flow
 (1) (2)

10Ltr

10Ltr

t=0
 t=0

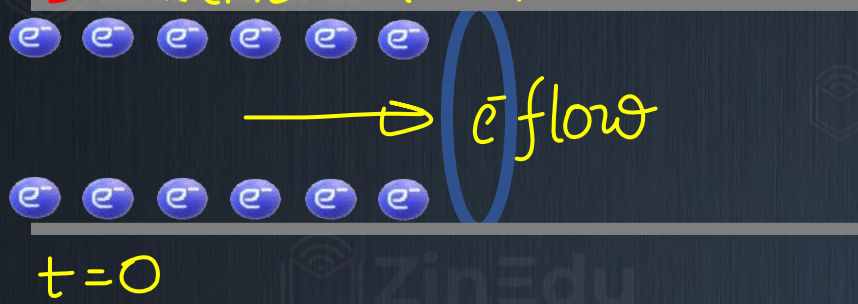
Pipe: 2

t = 20sec
 t = 10sec

$$\left\{ \text{Current} \propto \frac{1}{t} \right\}$$



(i) i_1 Electric current

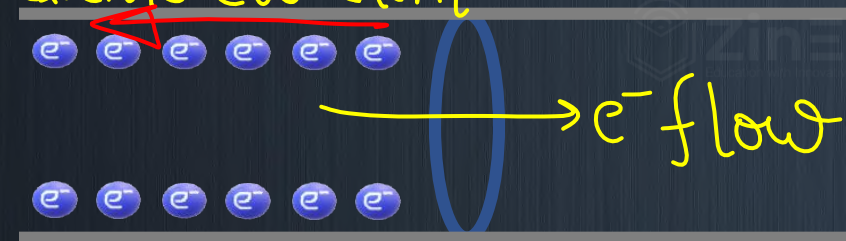


e^- flow -ve charge

More rate of flow of e^- ----- more electric current

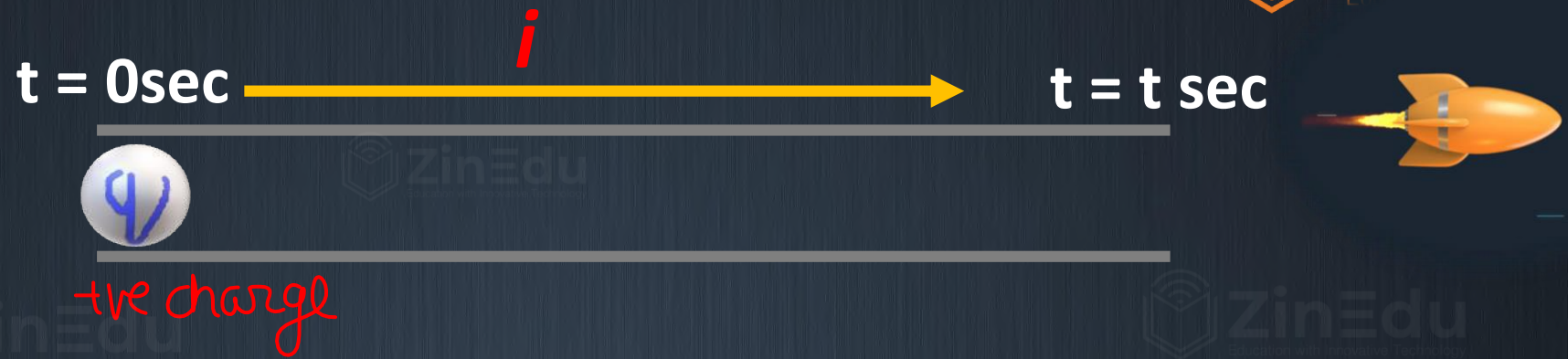
(ii) i_2

Electric current



Current flow \oplus flow

$\left\{ \frac{\text{Current} \times \text{charge}}{\text{time}} \right\}$



Rate of flow of charge is known as electric current

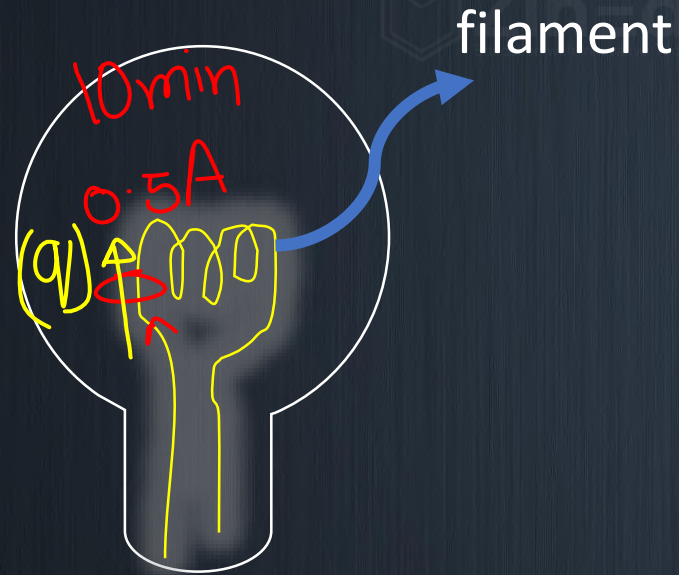
$$i = \frac{q}{t}$$

q → charge (Coul.)
 t → time (sec)

$i \rightarrow SI \rightarrow \left(\frac{C}{\text{sec}}\right) \equiv \text{Amp.}$



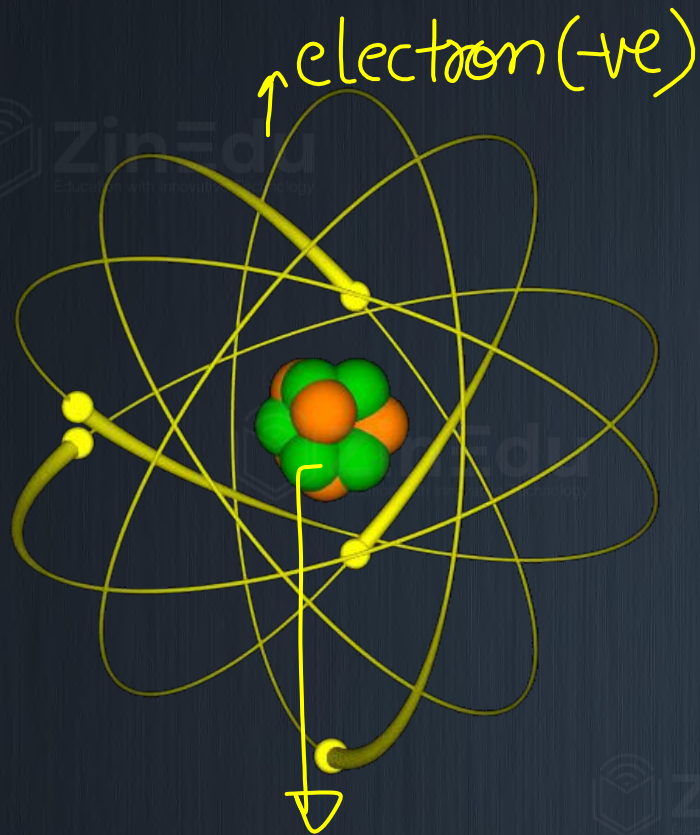
Q. A current of 0.5A is drawn by a filament of an electric bulb for 10minutes. Find the amount of electric charge that flows through the circuit.



$$q = ?$$

$$i = \frac{q}{t}$$

$$0.5 = \frac{q}{10 \times 60} \Rightarrow q = 0.5 \times 600 = 300 \text{ C Ans} //$$



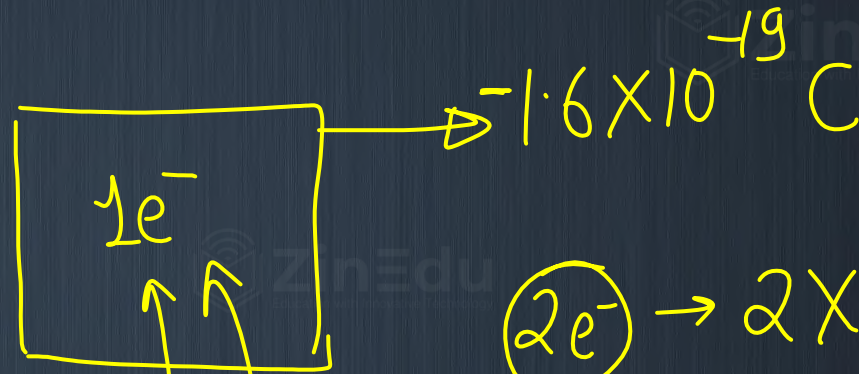
Proton (+ve)

neutron → Neutral
= (0 C)

Electron ⇒ $(1e^- = -1.6 \times 10^{-19} \text{ C})$

Proton ⇒ $(1p^+ = +1.6 \times 10^{-19} \text{ C})$

Neutron ⇒ $(1n = 0 \text{ C})$



$$2e^- \rightarrow 2 \times 1.6 \times 10^{-19} \text{ C}$$

$$3e^- \rightarrow 3 \times 1.6 \times 10^{-19} \text{ C}$$

no. of electrons $1e^- \quad 1e^-$

$$\text{charge} = n \times 1.6 \times 10^{-19} \text{ C}$$

$$(q) = ne^-$$

Q. A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross section of the filament in 16 seconds would be roughly

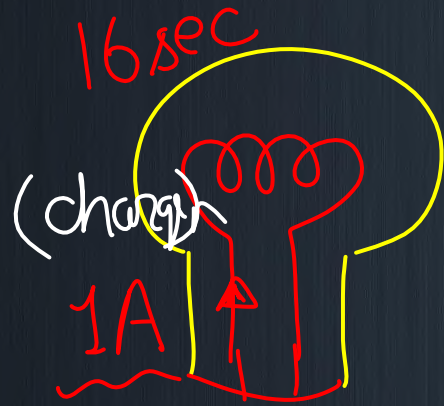


(a) 10^{20}

(b) 10^{16}

(c) 10^{18}

(d) 10^{23}



no. of $e^- = ? = (n)$

$$\text{charge} = i t = 1 \times 16 = 16 \text{ C}$$

$$n \times e^- = 16 \text{ C}$$

$$n = \frac{16}{1e^-} = \frac{16 \times 10}{1.6 \times 10^{-19}} = 10 \times 10^{19} = 10^{20}$$

no. of electron
Answer

$$i = \frac{q}{t}$$
$$\{q = it\}$$

$$\{q = ne^-\}$$

Q. If one ampere current flows through a conductor, the number of electrons flowing across the cross section of the conductor in 2 seconds is _____.

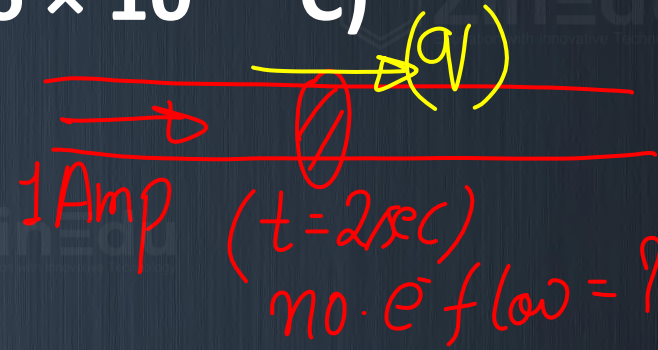
(Take the charge on electron equal to 1.6×10^{-19} C)

(a) 1.6×10^{-19}

(c) 6.25×10^8

✓ (b) 1.25×10^{19}

(d) 3.2×10^{18}



$$q = i t = 1 \times 2 = 2 \text{ C}$$

$$\Rightarrow n \times e^- = 2 \text{ C}$$

$$n = \frac{2}{1e^-} = \frac{2}{1.6 \times 10^{-19}} = \frac{2 \times 10}{1.6} \times 10^{19} = 1.25 \times 10^{19}$$

no. of e^- flow //

Q. When a body is rubbed with another body a certain number of electrons are transferred. If the same number of electrons are allowed to flow through the cross section of a conductor in 2 s, 10 A electric current can flow through it. Determine the number of electrons transferred.



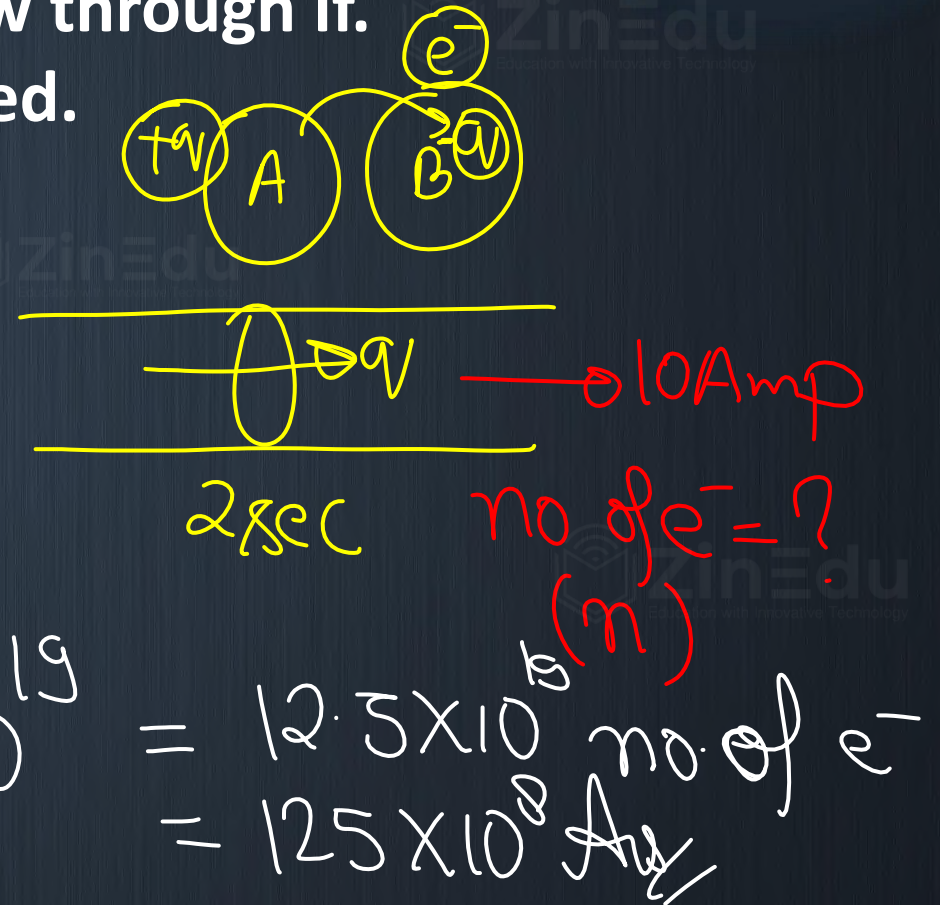
- (1) 215×10^{18}
- (3) 675×10^{19}

- (2) 16×10^{18}
- (4) 125×10^{18}

$$q = it = 10 \times 2 = 20 \text{ C}$$

$$n e^- = 20$$

$$n = \frac{20}{1.6 \times 10^{-19}} = \frac{12.5}{50} \times 10^{19} = 125 \times 10^{18}$$



$$= 12.5 \times 10^{18} \text{ no. of } e^-$$

$$= 125 \times 10^{18} \text{ Ans}$$

Thanks For Watching



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