



SIR PRATEEK JAIN

- . Founder @Physicsaholics
- . Top Physics Faculty on Unacademy (IIT JEE & NEET)
- . 8+ years of teaching experience in top institutes like FIITJEE (Delhi, Indore), CP (KOTA) etc.
- . Produced multiple Top ranks.
- . Research work with HC Verma sir at IIT Kanpur
- . Interviewed by International media.



Prateek Jain

#1 Educator in Physics · IIT JEE

Senior Physics Faculty (KOTA) | 8+ yrs exp. | Produced AIR 6, AIR 10 etc. | Research work with HC VERMA sir at IIT K.

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7K Dedications



Prateek Jain

#1 Educator in Physics · NEET UG

Senior Physics Faculty (KOTA) | 8+ yrs exp. | Produced AIR 6, AIR 10 etc. | Research work with HC VERMA sir at IIT K.

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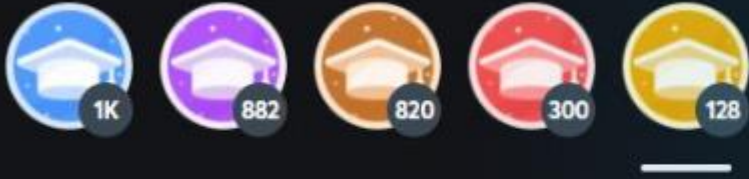
9M Watch mins (last 30 days)

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Dedications



Gold Hat

Dedicated at 100k minutes



Pjj Mudassir Hussain BTS • 12 minutes ago

A good teacher is like a candle it consumes itself to light the way for others.Thanks sir



Medha Mishra • 3 hours ago

Sir you are best physics faculty that i have seen in my life i like your teaching style i like your way of explanation of concept and you make me capable to solving the physics problem thanku 😊
sir

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RAMESH SHARDA



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← NEET UG Educators Overall ▾

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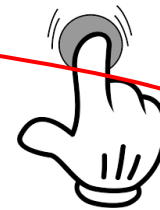
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H.C. Verma Physics

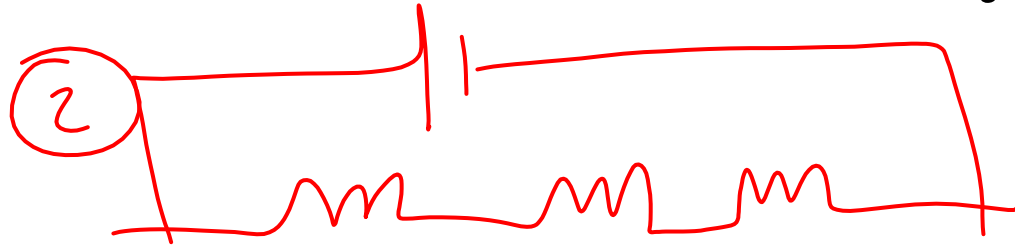
Questions for Short Answers

C-32 Current Electricity

By PRATEEK JAIN SIR

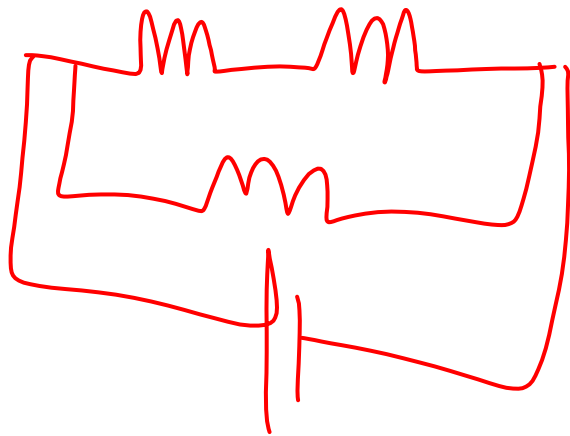


Q) Suppose you have three resistors each of the value $30\ \Omega$. List all the different resistances you can obtain using them.



$$R_{eq} = 90\ \Omega$$

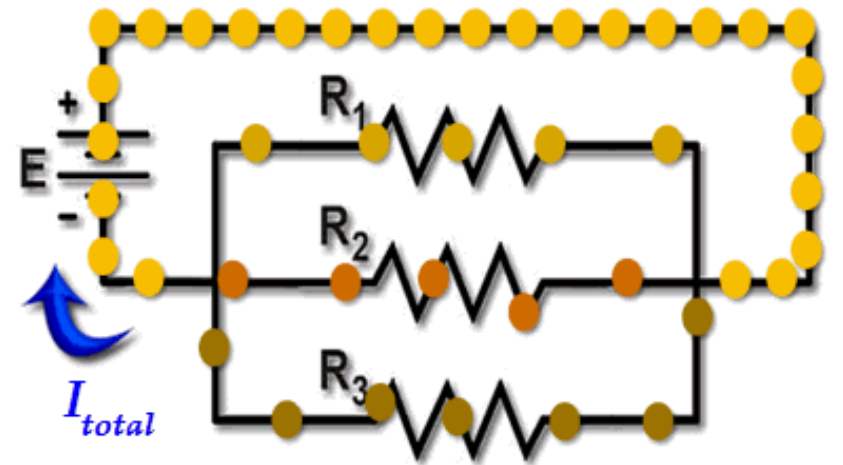
③



$$R_{eq} = \frac{30 \times 30 \times 30}{2 \times 30 + 30} = 20\ \Omega$$



$$R_{eq} = 45\ \Omega$$



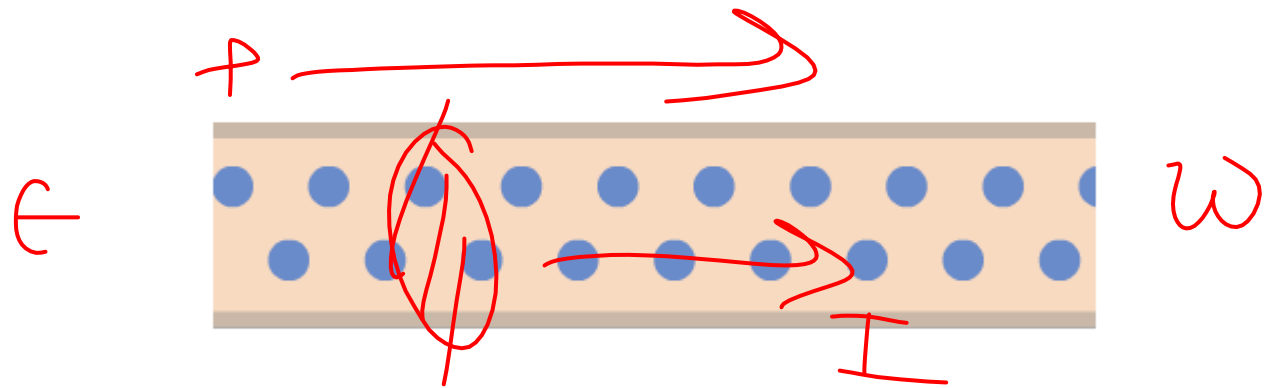
⑤

$$R_{eq} = 10\ \Omega$$

Q) A proton beam is going from east to west. Is there an electric current? If yes, in what direction?

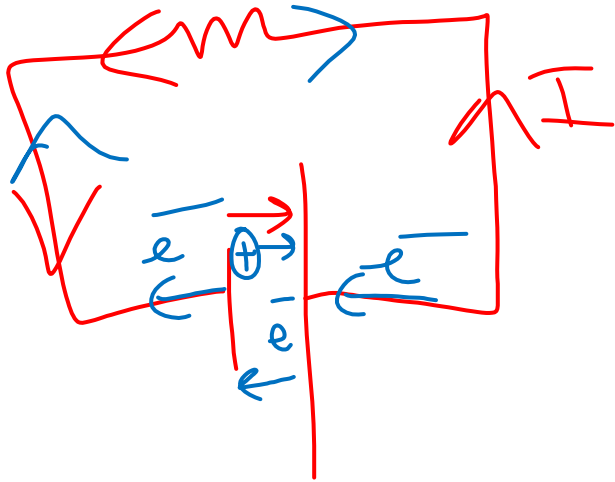
pve

Yes

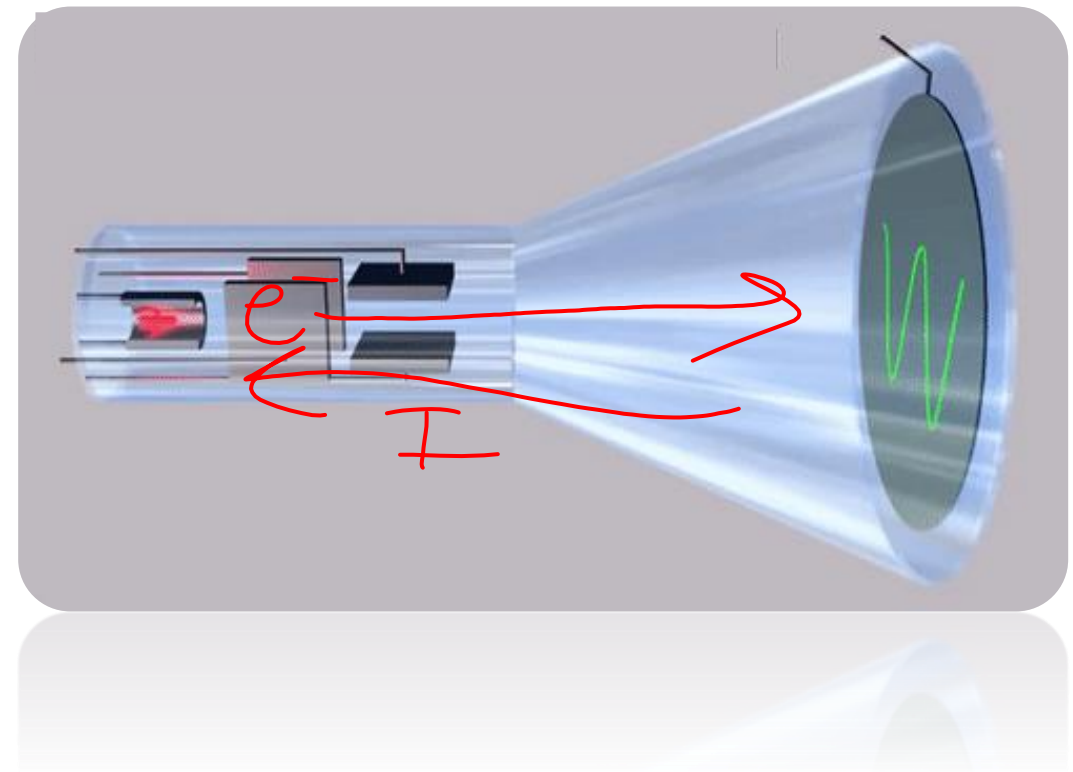


● Proton

Q) In an electrolyte, the positive ions move from left to right and the negative ions from right to left. Is there a net current? If yes, in what direction?

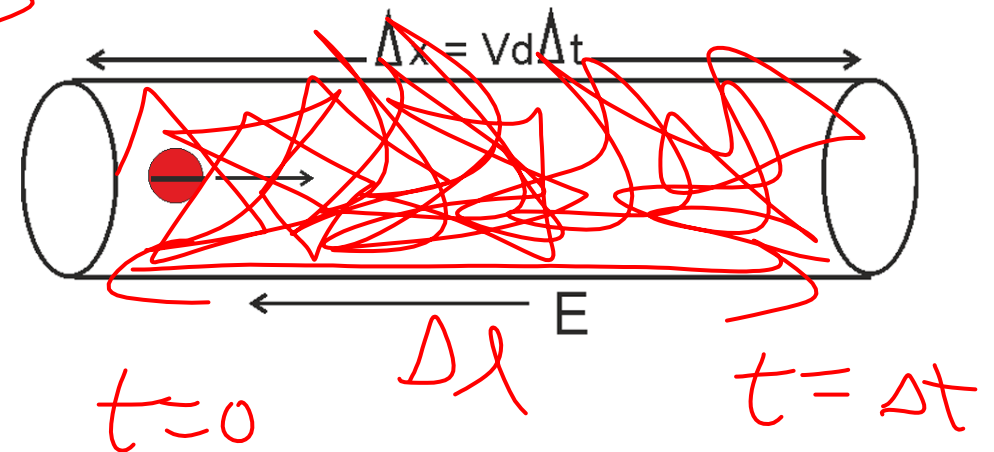


Q) In a TV tube, the electrons are accelerated from the rear to the front. What is the direction of the current?

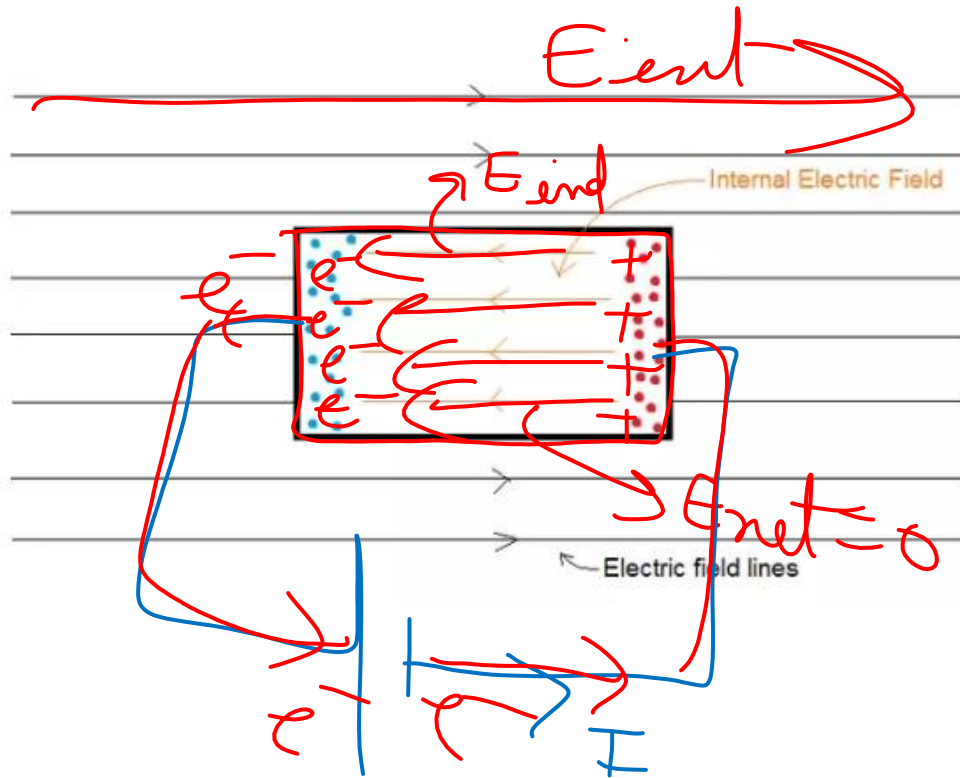


Q) The drift speed is defined as $v_d = \frac{\Delta l}{\Delta t}$ where Δl is the distance drifted in a long time Δt . Why don't we define the drift speed as the limit of $\frac{\Delta l}{\Delta t}$ as $\Delta t \rightarrow 0$?

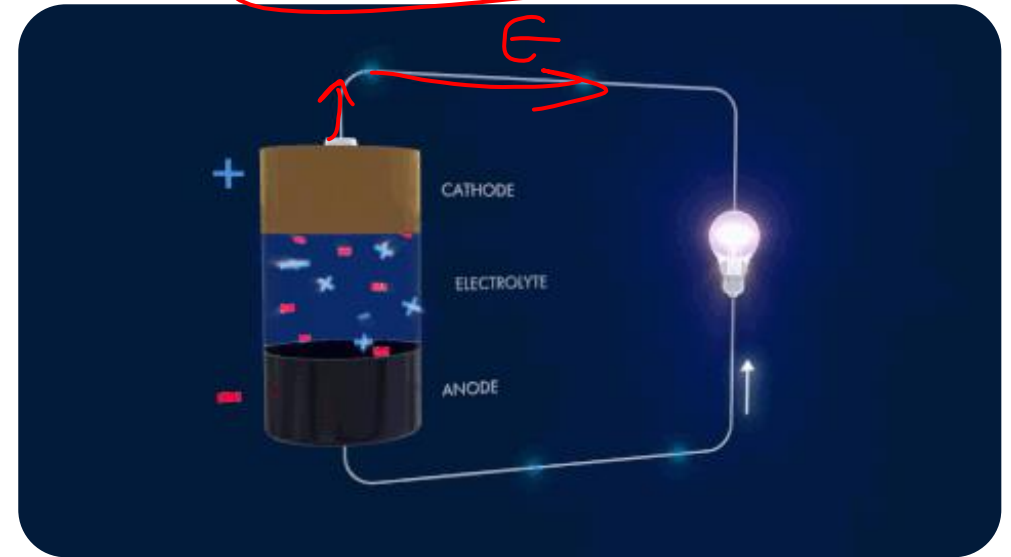
$$v \rightarrow 10,000, \frac{m}{s}$$



Q) One of your friends argues that he has read in previous chapters that there can be no electric field inside a conductor. And hence there can be no current through it. What is the fallacy in this argument?

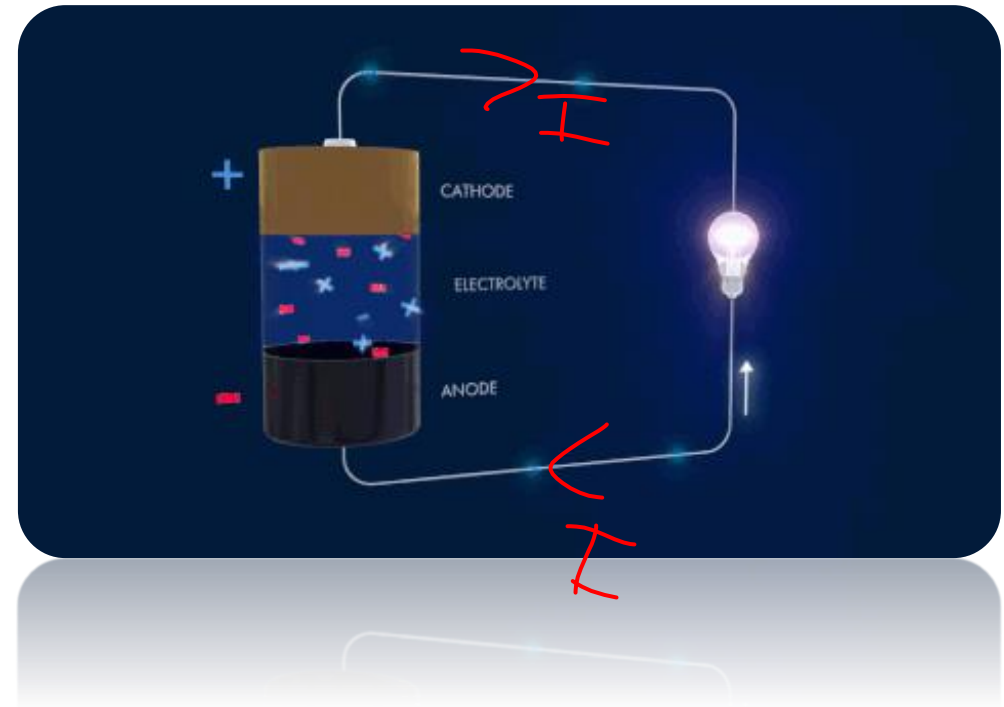


$$J = \sigma E$$



Q) When a current is established in a wire, the free electrons drift in the direction opposite to the current. Does the number of free electrons in the wire continuously decrease?

No



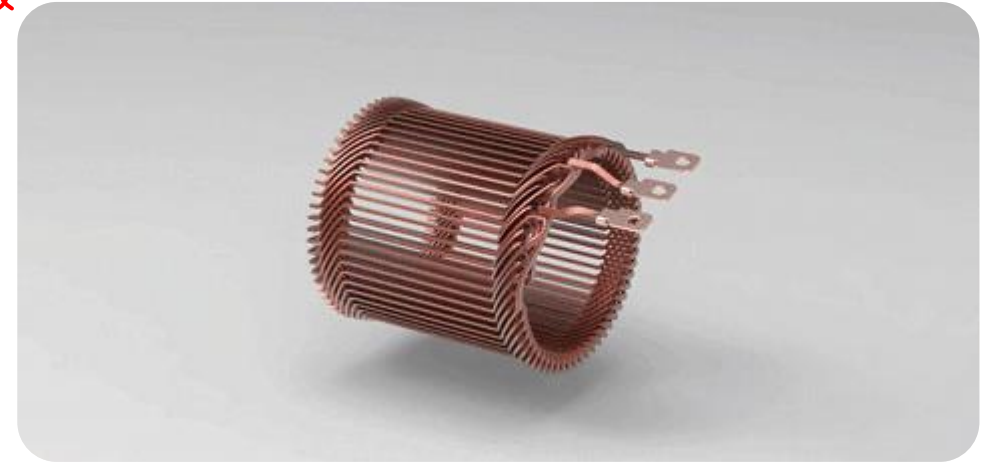
Q) A fan with copper winding in its motor consumes less power as compared to an otherwise similar fan having aluminium winding. Explain.



$l \rightarrow$ Same
 $A \rightarrow$ Same

$$R = \frac{\rho l}{A}$$

$$P = I^2 R$$



Copper winding



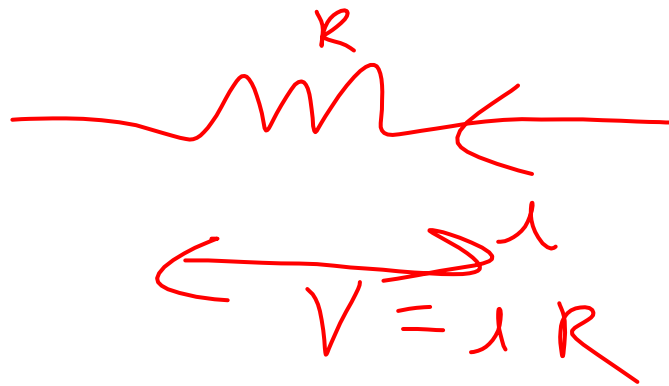
Melting point of copper: 1085 °C

Melting point of aluminium: 660 °C

Resistivity of copper is ρ_c 1.68×10^{-8} Ohm

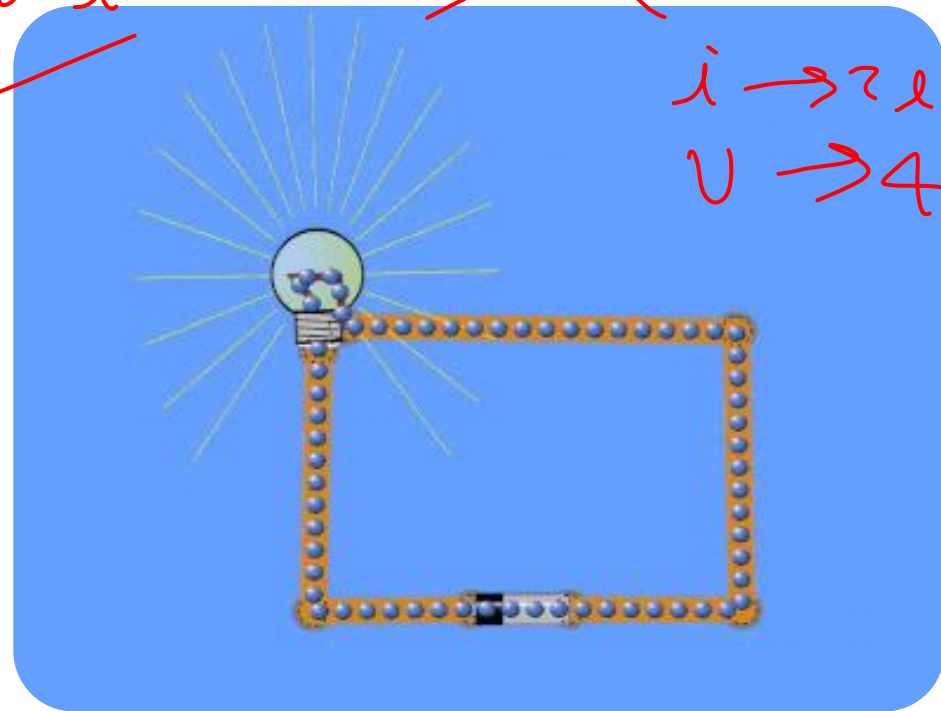
Resistivity of aluminium 2.65×10^{-8} Ohm
 ρ_{Al}

Q) The thermal energy developed in a current-carrying resistor is given by $U = i^2 R t$ and also by $U = V i t$. Should we say that U is proportional to i^2 or to i ?



$U \propto i^2$

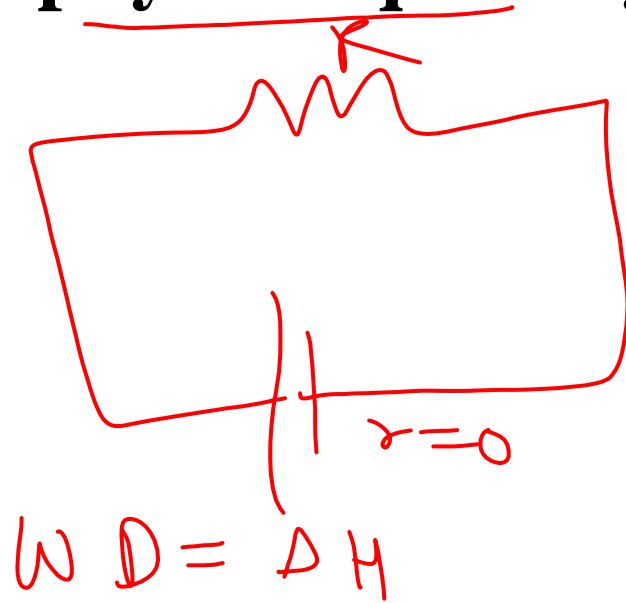
~~$U \propto i$~~



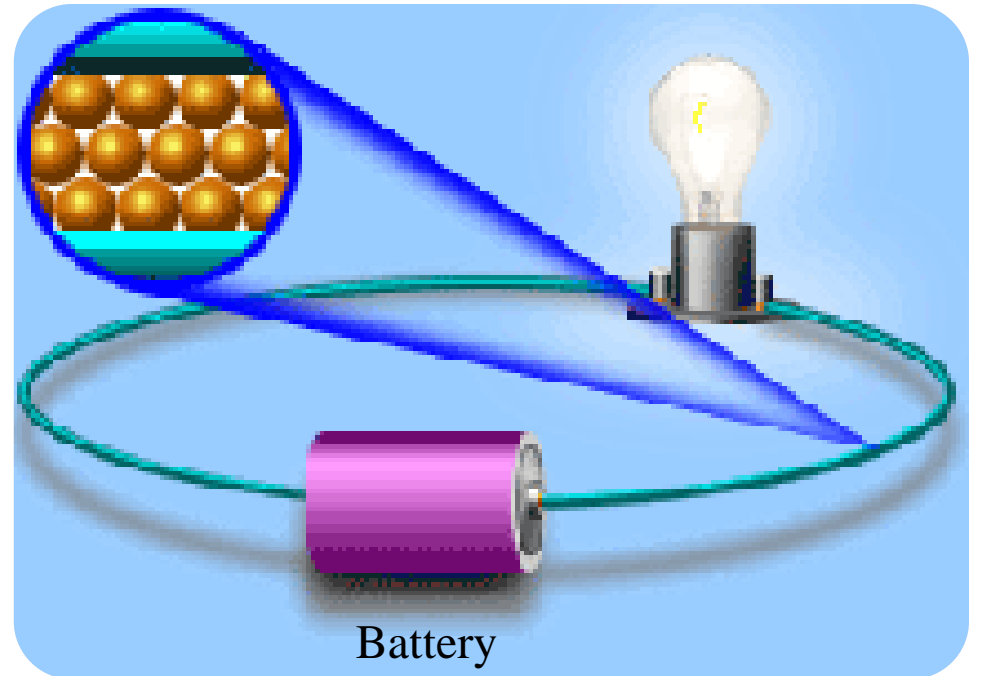
$i \rightarrow 2i$
 $U \rightarrow 4U$

$$F = m \cdot a$$

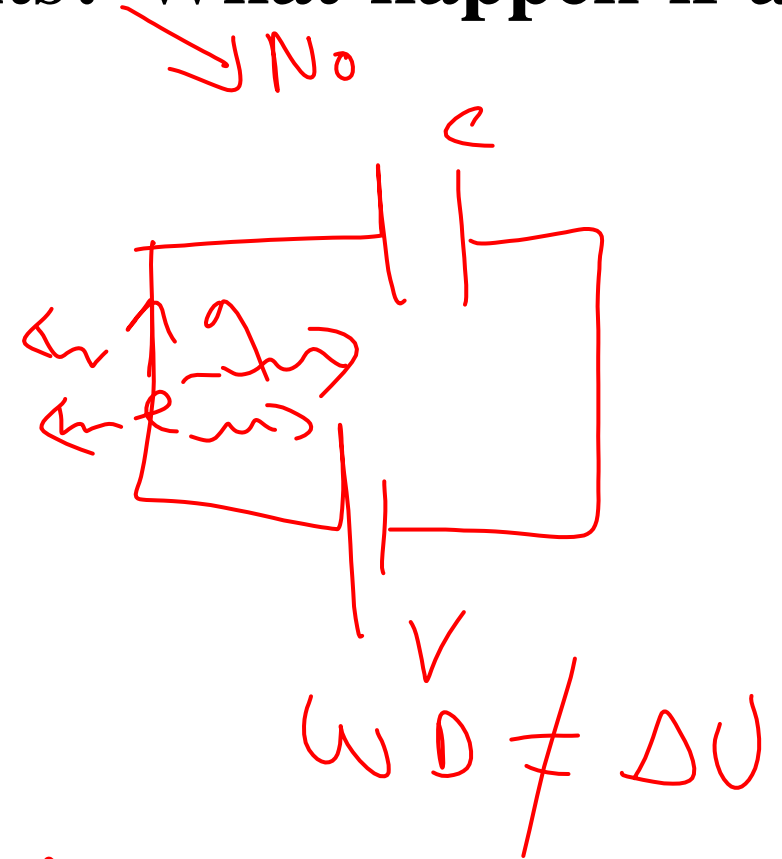
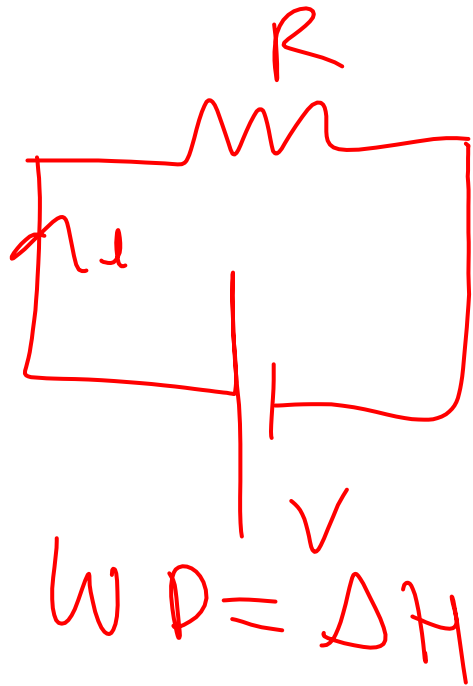
Q) Consider a circuit containing an ideal battery connected to a resistor. Do “work done by the battery” and “the thermal energy dissipated” represent two names of the same physical quantity? \rightarrow No



$$I_n = \Delta P$$

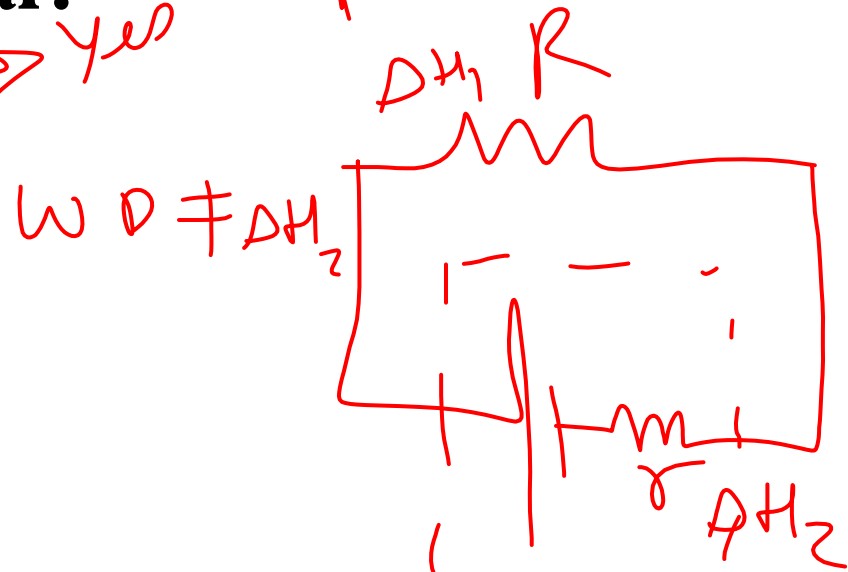


Q) Is work done by a battery always equal to the thermal energy developed in electrical circuits? What happens if a capacitor is connected in the circuit?

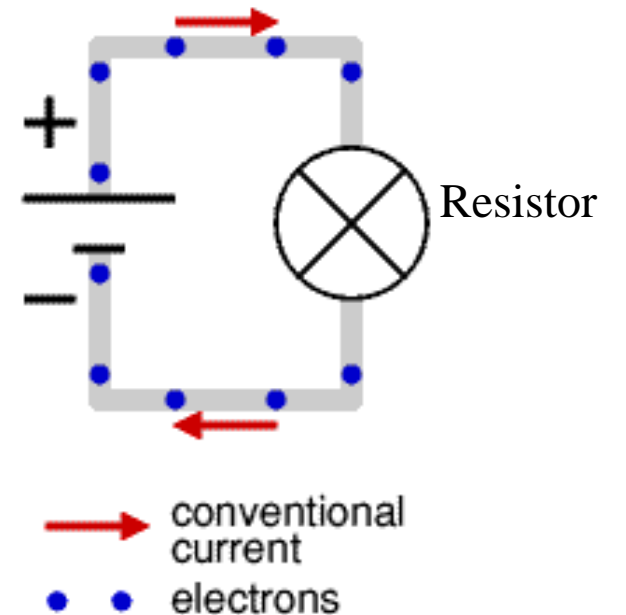


Q) A non-ideal battery is connected to a resistor. Is work done by the battery equal to the thermal energy developed in the resistor? Does your answer change if the battery is ideal?

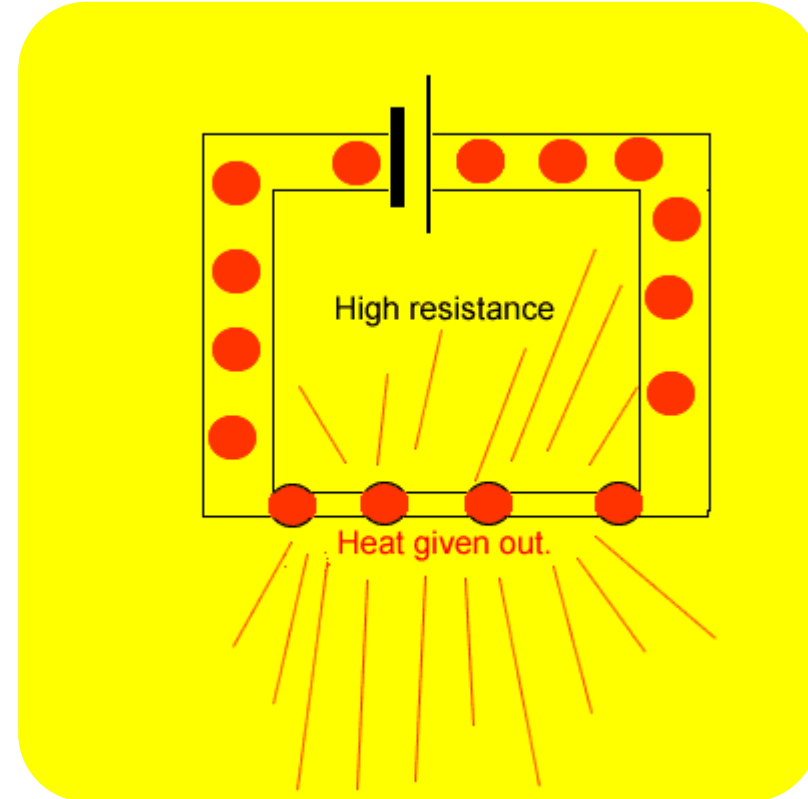
$w \cdot D = \Delta H_1$ \rightarrow No
 \rightarrow Yes



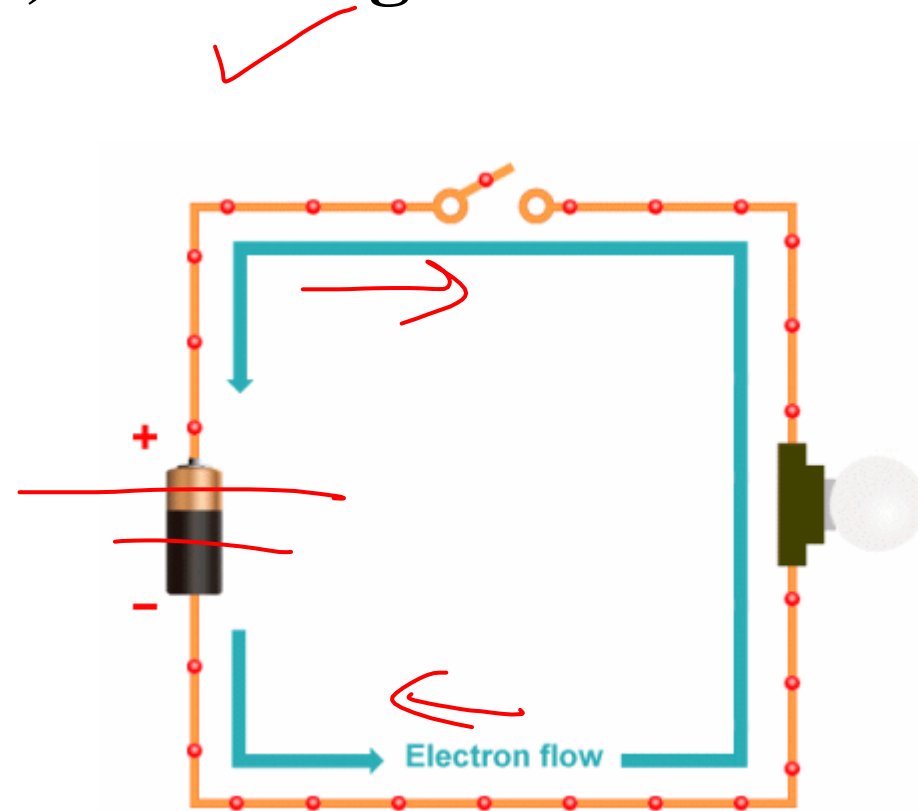
$$w \cdot D = \Delta H_1 + \Delta H_2$$



Q) Sometimes it is said that “heat is developed” in a resistance when there is an electric current in it. Recall that heat is defined as the energy being transferred due to the temperature difference. Is the statement under quotes technically correct?



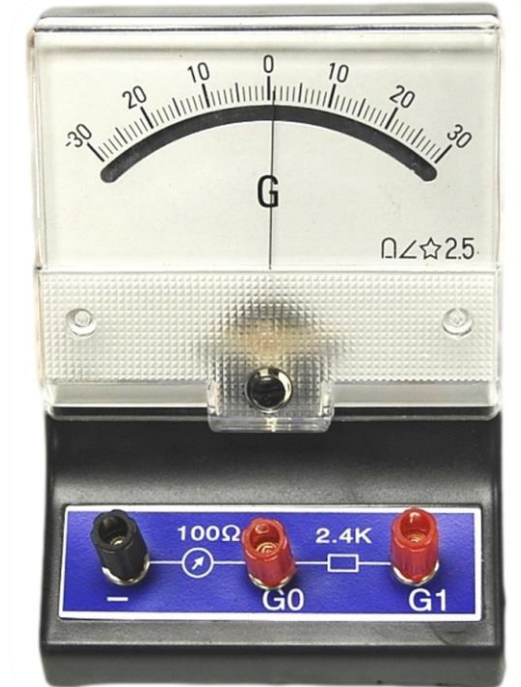
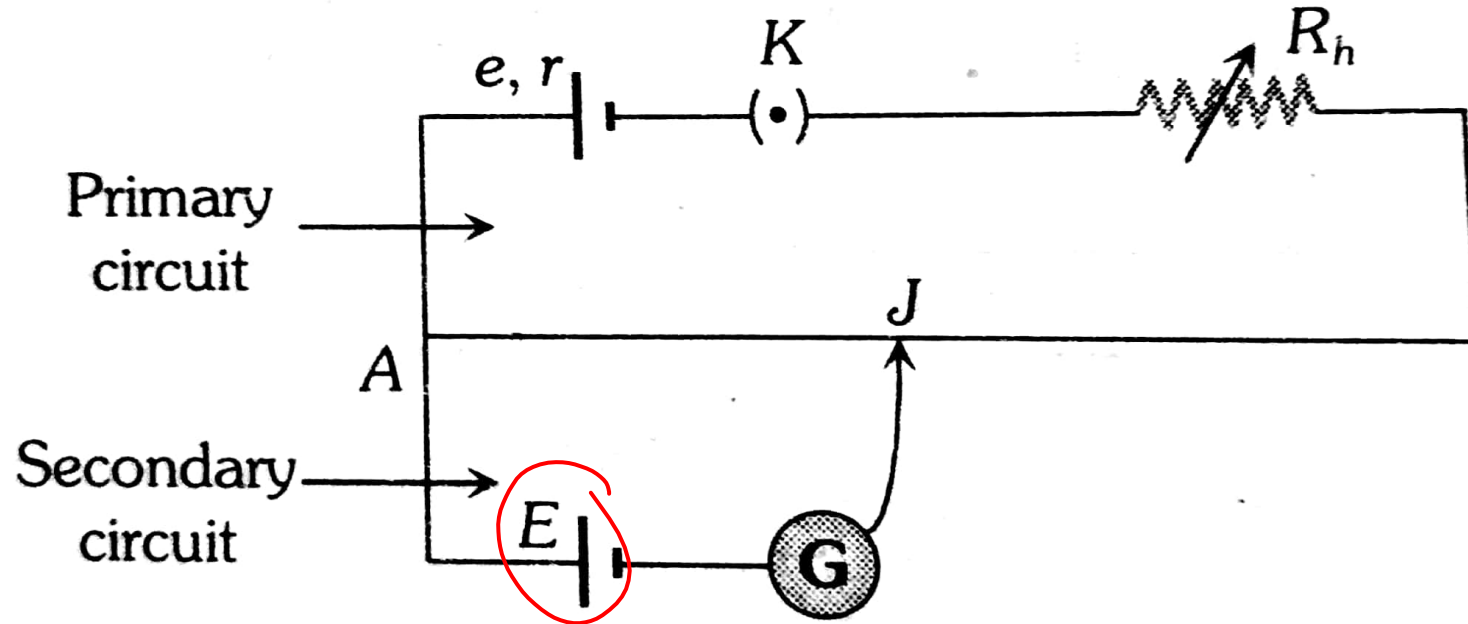
**Q) We often say “a current is going through the wire”.
What goes through the wire, the charge or the current?**



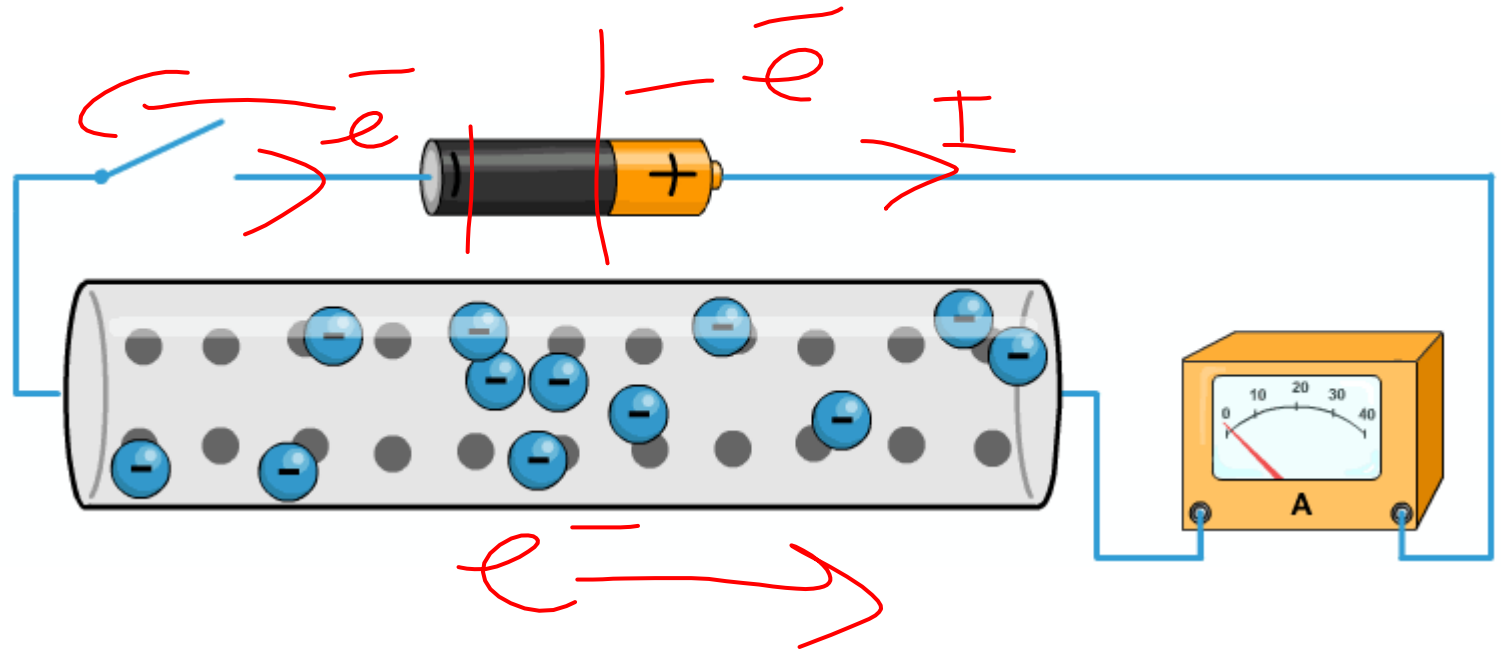
Q) Would you prefer a voltmeter or a potentiometer to measure the emf of a battery?

Some error

No error



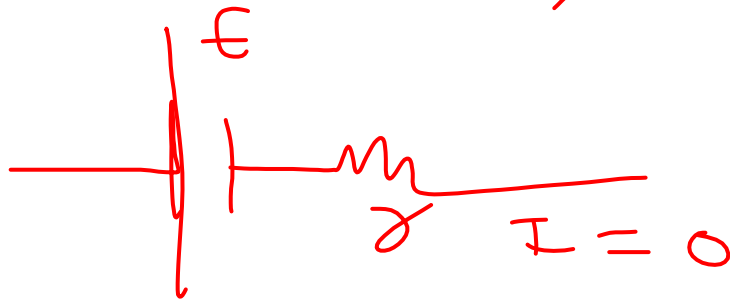
Q) Does a conductor become charged when a current is passed through it? \longrightarrow No



Q) Can the potential difference across a battery be greater than its emf?

→ Yes.

①

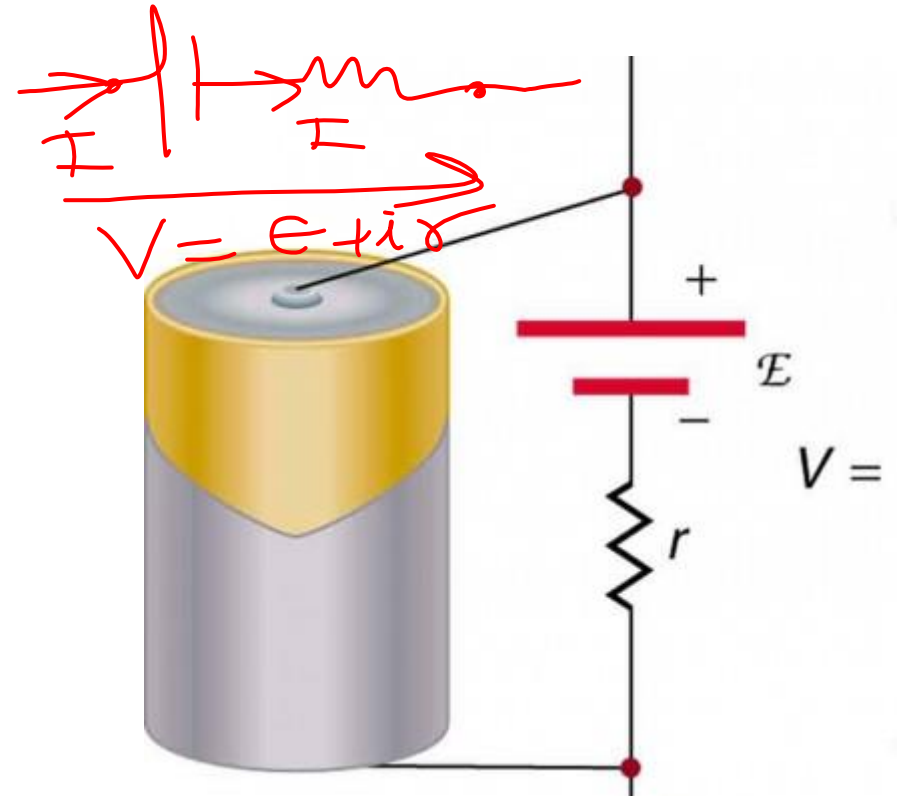


$V = \epsilon$

②



$V = \epsilon - ir$





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Chalo Niklo