

Applied Physics

1

Code PHYS 101

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Lecture no 1

Physics → Knowledge of nature.
→ Physical and Fundamental Science
→ Understanding the universe

“Study of matter, energy and relationship between them”

Matter → Anything that have mass and occupy physical space

Energy → Ability to do work.

Applied Physics

→ Bridge between Physics and engineering
→ Technical and Practical use of Physics

Electronics

→ Flow of current through semi-conductors
→ Behaviour of electron under applied electric field.

→ Electronic devices are main building blocks of modern technology.

→ Motion of electrons → Current

→ Sources of current are Batteries and generators.

→ Electronic devices e.g. ATM machines, USB drive, TV, Digital Camera, Mobile, Computers, Projectors, X-ray machines..... many more.

→ **Why** studying this course?

To learn Manufacturing and working principles of these devices

Also able to make your own electronic circuits or devices.

→ Dealing with computers, this knowledge helps in understanding Computer Hardware.

Circuit :-

All electronic devices have electronic circuit. Circuit provides a path for current to flow. Circuit must be closed.

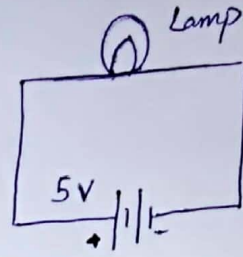
Electronic circuit in contrast with electrical circuit, operates at low voltages.

Example of a simple circuit is

Battery and lamp.

It can be complex
but main elements are

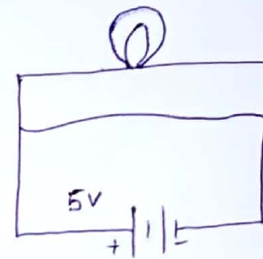
- 1- Voltage source (battery)
- 2- Load \rightarrow consumes power.



- 3- Conductive path. (closed)
shows actual work done by the circuit

Short Circuit ..

\rightarrow Current always follow path
with low resistance



Potential / Voltage.

- \rightarrow Difference in charges between two points.
- \rightarrow Potential energy between two points.
- \rightarrow Greater voltage means greater amount
of charge carriers are forced to flow
in a circuit.

Resistance :

Materials tendency to resist the
current.

In a circuit its role is to
limit the current

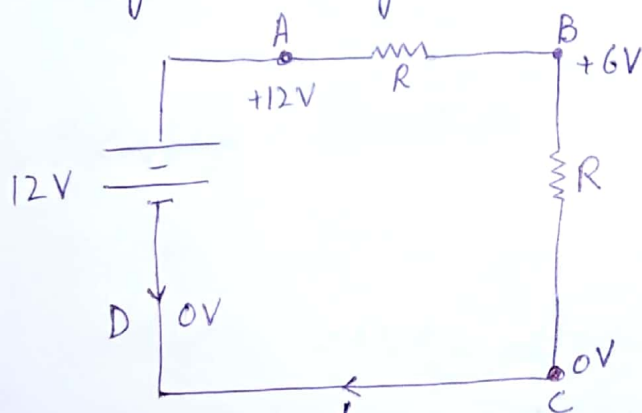
→ Resistance with LED prevents it from heating up.

→ other components of circuit are inductor, capacitor, transistor etc.

Zero Reference Level

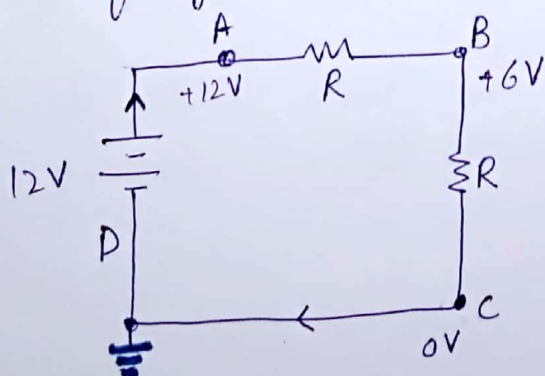
To avoid errors in measurements of voltages zero reference level is essential.

It may or may not be 0 Volt.



Direction of conventional current.

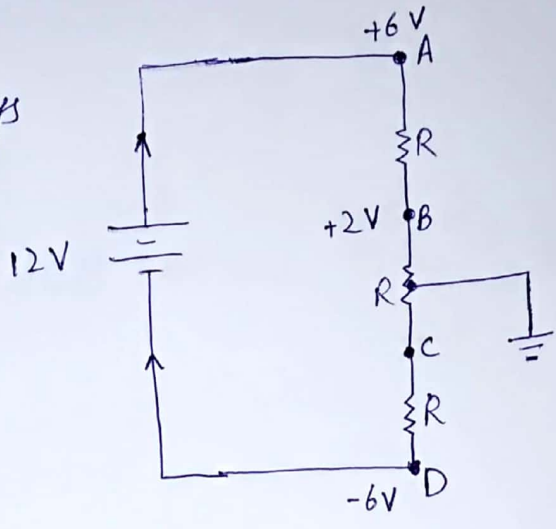
Symbol (for ground) is 3 short lines



→ If +ve terminal is grounded, there will be no difference, magnitude will remain same only sign is -ve.

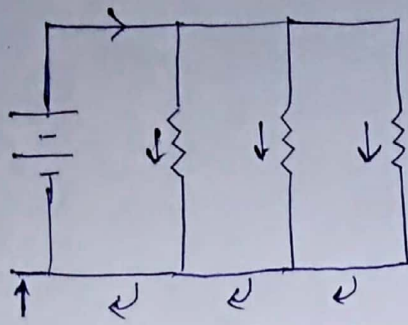
→ If zero reference level is at middle of the circuit

Conventional current always flow from higher potential to lower potential.

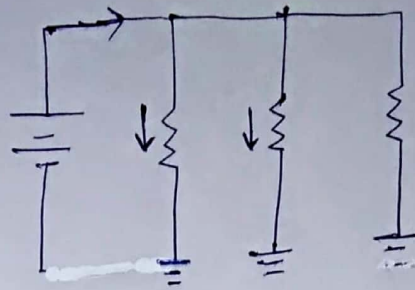


Chassis Ground

- Electronic circuits are mounted either on conducting metal sheet or on a non-conducting board.
- Conducting metal sheet is known as Chassis.
It provides return path to currents so its body itself is used as common ground. (Chassis Ground).

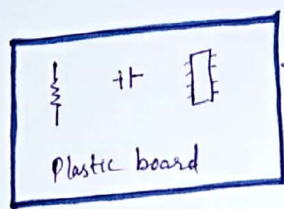


Chassis Ground



It simplifies the circuit.

→ If non-conducting board is used (e.g. plastic board) → called **PCB** (Printed Circuit Board).



→ edges are made ground by using rim of Solder

Solder → metal alloy.
melted to adhere.

← The End →

General Knowledge:

- John Logie Baird invented the Television.
- Charles Babbage invented the first computer.
- Graham Bell invented the Telephone.
- Shockley, Bardeen and Brattain developed first Transistor.
- Jack Kilby developed first Integrated Circuit.