



# Electronic Instrumentation Measurement

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# Measurement

- Measurement is the act or the result of comparison between an unknown quantity and known quantity
- Methods-
  - Direct methods
  - Indirect methods (comparison is made or by calculations)

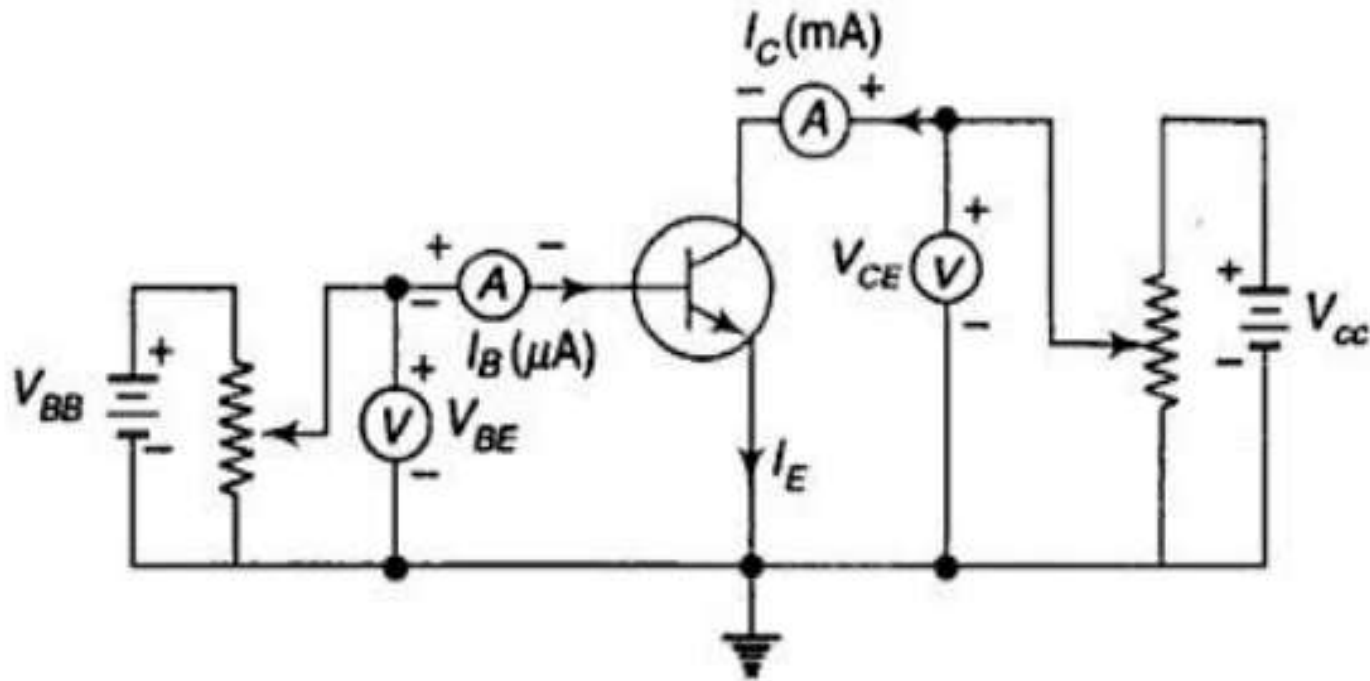


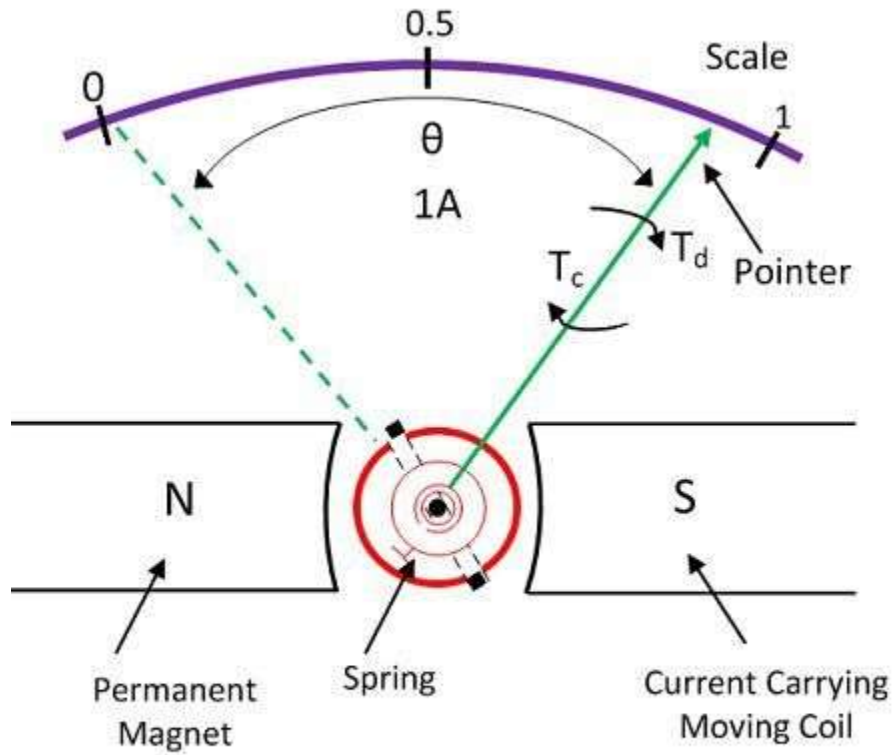
# Direct methods

- In direct measurement methods, the unknown quantity (measurand) is measured directly instead of comparing it with a standard.
- Eg.:-measurement of current by ammeter
- Voltmeter, ohmmeter, wattmeter, etc.,



Ammeter will be connected in series  
Voltmeter will be connected in parallel





## Deflecting Type Instrument

Circuit Globe



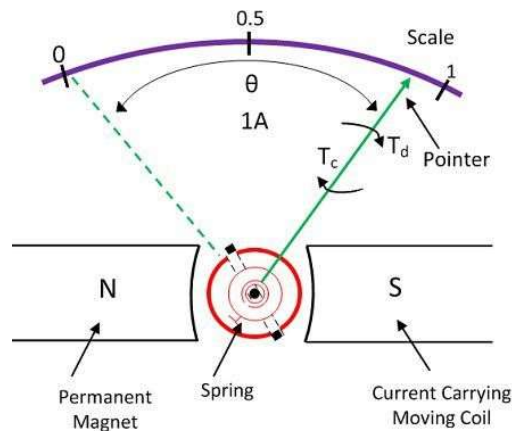
# Comparison method

- Unknown value is compared with standard value



# Deflection methods

- The value of the unknown quantity is measured by the help of a measuring instrument having a calibrated scale indicating the quantity under measurement directly



Deflecting Type Instrument

Circuit Globe

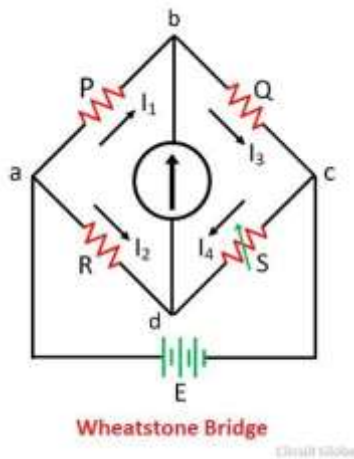


# Comparison methods

- The value of the unknown quantity is determined by the comparison with a standard of the given quantity
- Comparison of an unknown emf with known emf

Two types :

Null method and differential method



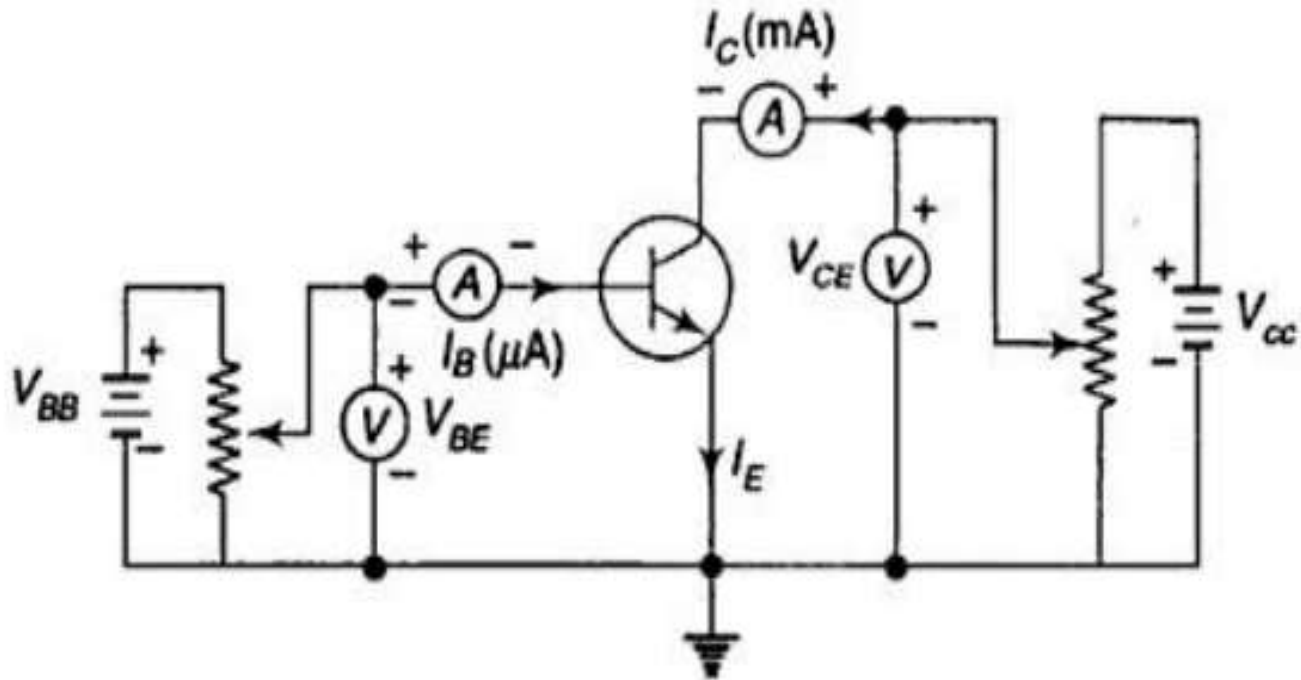


# Null methods

- The action of the unknown quantity upon the instrument is reduced to zero by the counter action of a known quantity of same kind



In direct method: unknown quantity is determined by measuring the functionally related quantity and then measuring it directly



$$R = V/i$$



- Methods:direct and indirect
- Direct:
  - Deflection and comparison methods
- Comparison method:
  - null method and differentials methods



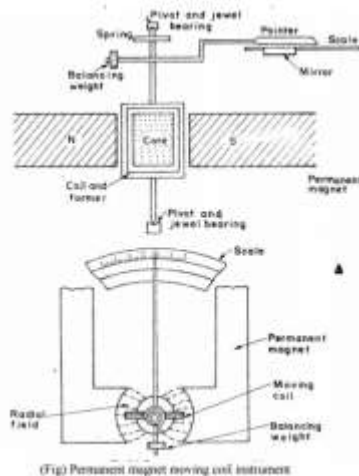
# Analog Multi meter

- An instrument which measures voltages(Volts), currents(ampere) and resistances(ohms) of various ranges
- Multimeter is two types
  - ❖ Digital multimeter(digital output)
  - ❖ Analog multimeter(analog output)
- DC and AC measurements—AVO meter (Ammeter, voltmeter and ohmmeter)

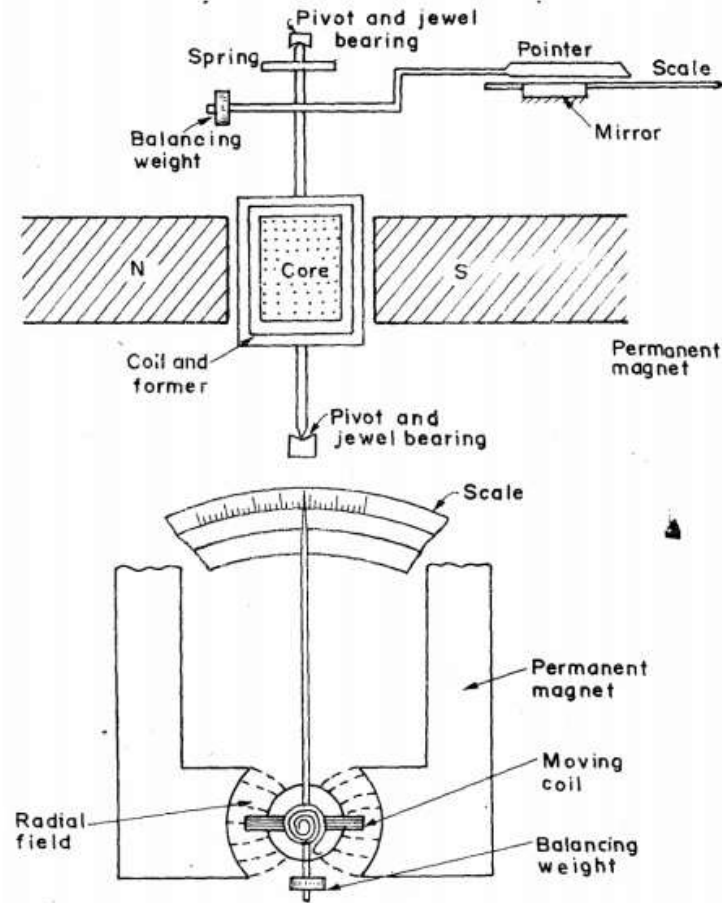


# Working principle of analog multimeter

- It is basically permanent magnetic moving coil galvanometer(moving coil-moving in magnetic filed of permanent magnet.
- Moving coil-it is wounded on an aluminium former
- A pointer is attached to the coil



# PMMC



(Fig) Permanent magnet moving coil instrument



Thank you

