TO FIND OUT THE DENSITY OF AN IRREGULAR SHAPED BODY

(1)

Apparatus required: Measuring cylinder, string for tying up the body, irregular shaped body, measuring scale, beam balance.

Procedure:-

(1) First we measure the mass of the irregular shaped body on a beam balance.

(2) It is to be tied up with a string and put into the measuring cylinder which is filled with water upto a known volume, say V_1.

(3) After putting into the water, the level of water will rise, say V_2, be the new volume of water.

(4) Hence, the volume occupied by the irregular shaped body will be $V_2 - V_1$

(5) Density $= \frac{\text{Mass}}{\text{Volume}} = \frac{M}{V_2 - V_1}$

Part A

Aim: Induction precedes attraction (in a magnet)

Apparatus: A bar magnet, an iron object,

Procedure

When a bar magnet of north pole (N) is brought nearest to an iron object, it is observed that the iron object will get attracted towards the bar magnet.

Since, the North pole(N) of a magnet induces opposite polarity i.e. South pole (S) at the nearer end of the iron object and North pole (N) at the far end of the iron object, and the distance between the North pole of the magnet and induced South pole of the iron object is less, so the force of attraction is maximum, and the iron object will get attracted towards the magnet.

So, induction precedes attraction.

Part B

Aim: Repulsion is the surer test of magnetisation.

Apparatus: An iron object, two bar magnets

Procedure:

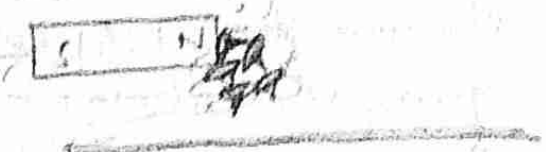
When a bar magnet is brought nearer to an iron object, then attraction takes place due to induction.

When the north pole (N) of same bar magnet is brought nearer to the south pole (S) of the other bar magnet, it is observed that attraction takes place. So, attraction, take place in above both the cases and we could not say sure that the other substance is a bar magnet or iron object. When the North Pole (N) of same bar magnet is

brought nearer to the North Pole (N) of other bar magnet, then it is observed that repulsion takes place. So we can say sure that both the substance is a magnet.

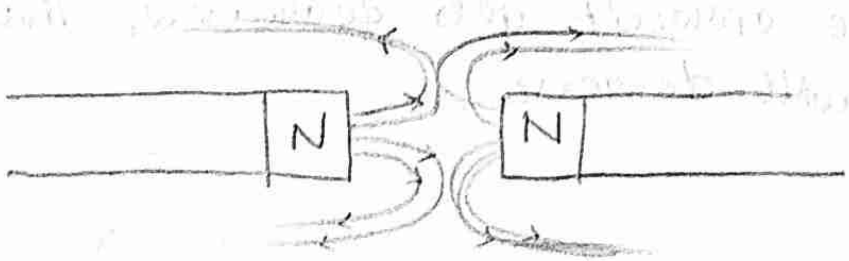
Hence, Repulsion is a surer test of magnetisation.

(a) Magnetic field.



(b) Magnetism preceded by attraction

Induction precedes Attraction



Repulsion is the surer test of Magnetism

Aim: To find the Acceleration due to gravity by measuring the variation in time period (T) with effective length (L) of a simple pendulum.

Apparatus: Metallic bob fitted with a hook, clamp stand, two split pieces of cork, approximate 2m long fine cotton thread, stopwatch, vernier callipers, metre rule, stand.

Theory: A simple pendulum consists of a heavy point mass suspended by a weightless, inextensible string from a rigid support about which it can oscillate without friction.

The distance between the point of suspension and the centre of mass of bob is known as the effective length of the pendulum.

The effective length of $L = l + r$

where l be the length of string with hook and r be the radius of the bob.

When the bob is slightly displaced from its equilibrium solution, it starts executing simple harmonic motion and the time period of this oscillation is given by the relation $T = 2\pi\sqrt{\frac{L}{g}}$

where $L = l + r$

Squaring both sides,

$$T^2 = 4\pi^2 \frac{L}{g}$$

$$g = \frac{4\pi^2}{\frac{T^2}{L}} = \frac{4\pi^2}{s}$$ where s = slope of T^2 vs L

Procedure: Set the pendulum by attaching the bob to a string about 1m in length. Clamp the string between two flat pieces of wood and adjust the height so that the bad is about 10cm from the top of table. Swing the pendulum so that it makes small angle of about 5° on either side of mean position. Record by means of a stopwatch, the time for twenty oscillations, dividing this time by 20, the time for one complete oscillation for the value of x = 30cm, 40cm, 50cm, 60cm, 70cm, 80cm, 90cm, 1m.

Observation table:

Least count of Vernier callippers = 0.1cm, Diameter = 2.5cm

Radius of the bob (r) = D/2 cm = 2.5/2 cm = 1.25cm

Least count of stopwatch = 0.1 secs, length of string = 88.75cm

Effective length = 88.75 + 1.25

= 90cm

USE OF MICROMETIRE SCREW GAUGE

Aim :→ To find the diameter of a wire using screw gauge and hence find out the area of cross-section of wire.

Apparatus :→ A screw gauge, a wire.

Procedure : (i) Determine the least count of the instrument.

$$\text{Pitch} = \frac{\text{Distance moved by screw}}{\text{Number of rotations}}$$

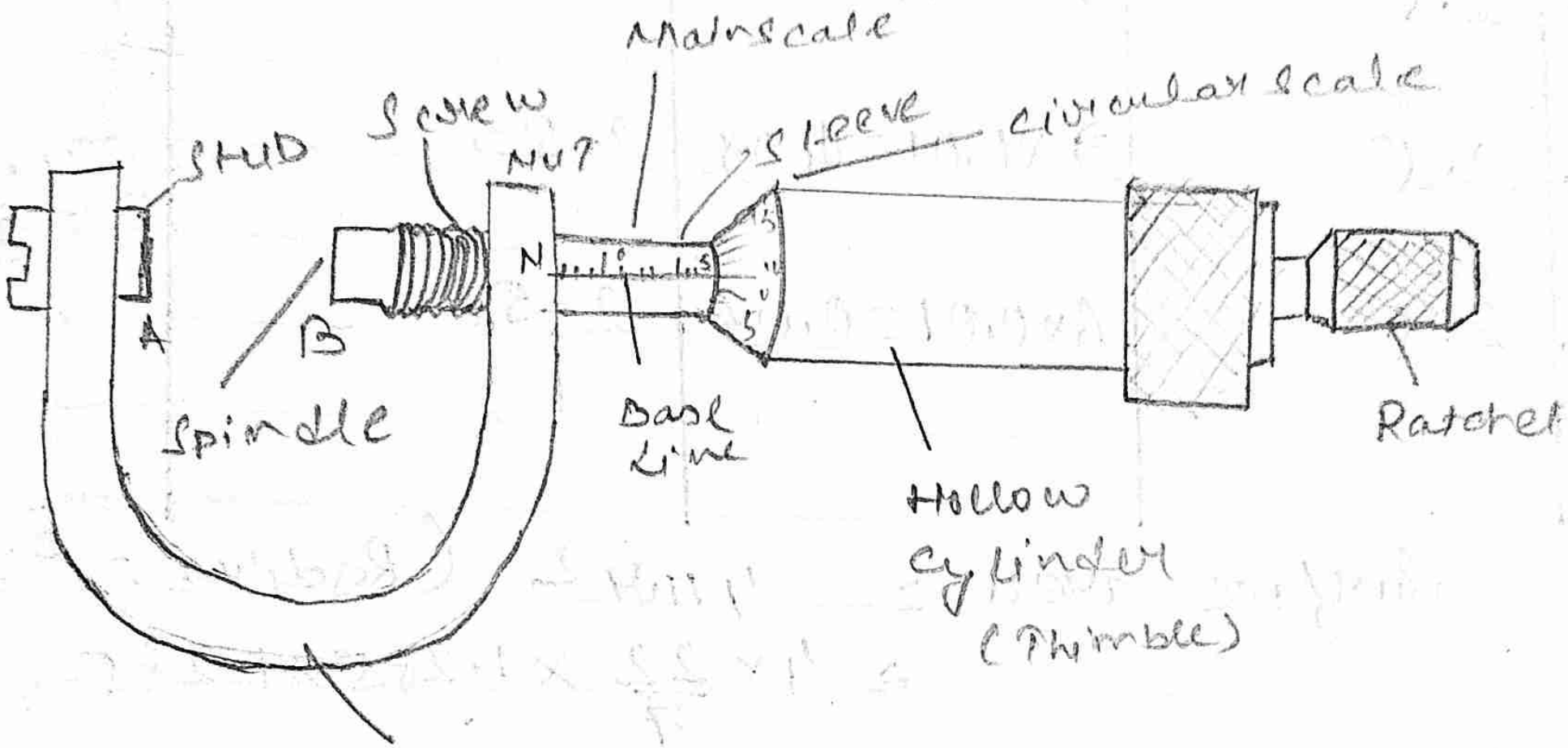
$$\text{Least Count} = \frac{\text{Pitch}}{\text{Total number of divisions on circular scale}}$$

(ii) Diameter of wire.

In order to find the diameter of the given wire place it in the gap between A and B in the diagram. Turn the screw head until the ratchet arrangement gives a click.

Note down the reading of the main scale.

Read the division of the circular scale coinciding with the reference line. Multiply it by the least count and add it to the main scale reading.


Main scale
Screw
Nut
Stud
Sleeve
Circular scale
N
Spindle
B
A
Base line
Hollow cylinder (Thimble)
Ratchet
U - Frame

Screw Gauge.

ELECTRICITY

(5)

Part I

Aim: Flow of current in a closed circuit

Apparatus: cell, connecting wire, a bulb, a switch (Key)

Procedure:-

When a Key is connected (i.e. the circuit is closed, it is observed that the bulb is glowing. Again when the key is opens it is observed that the bulb is not glowing.

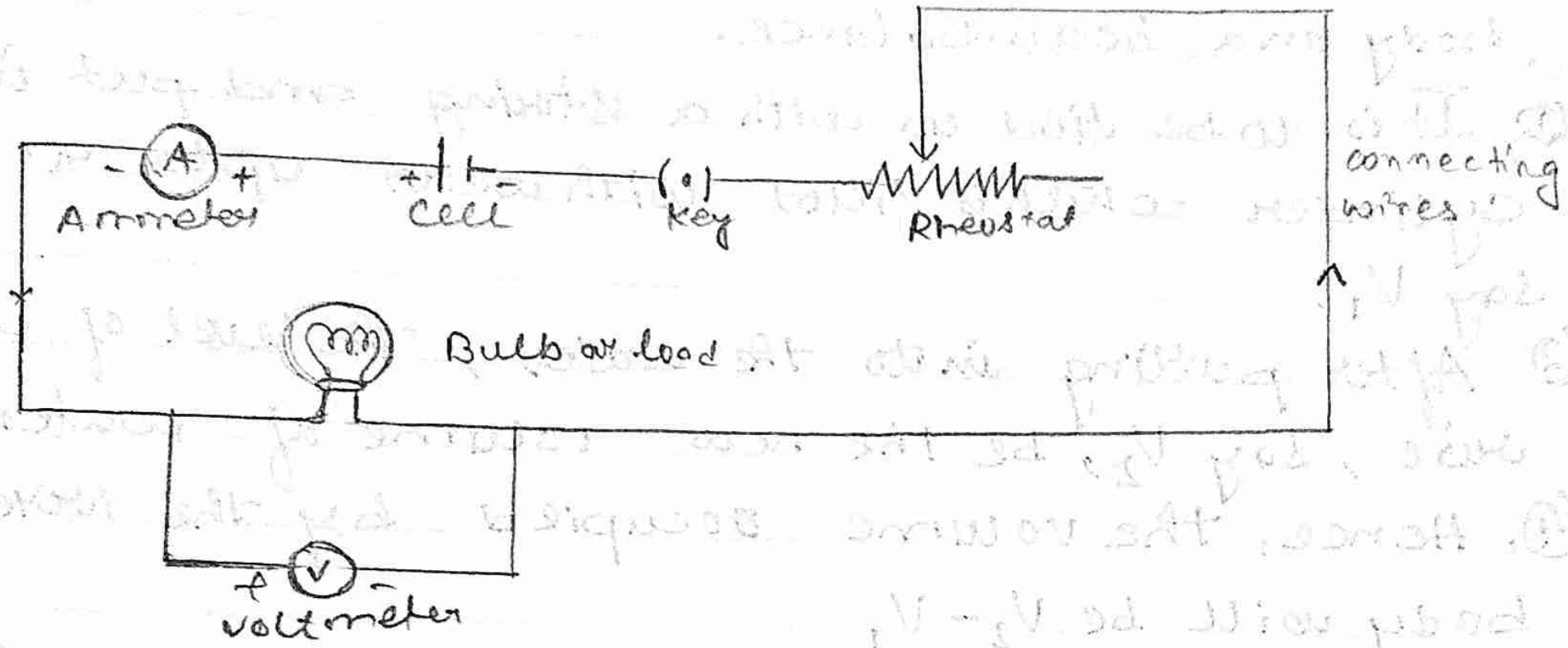
Hence, we conclude that when the circuit was closed, the current was flowing through the circuit, that is why the bulb was glowing and when the plug is taken out from the key, the circuit becomes open and current will not flow through it and hence the bulb will not glow. So, current flows in a closed circuit.

Part II

Aim: Effect of resistance circuit.

When a 1Ω resistance is applied across a circuit, the bulb will glow with certain intensity of light. When 2Ω resistance is applied across a circuit, then the intensity of the light of the bulb will decrease. Further, with increase in the resistance, the intensity gets decreased.

Hence, with increase in resistance, the flow of current through the circuit gets decreased. That's why, the intensity of bulb will decrease.



Electrical circuit