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MAGNETISM

magnetic materials: materials which are attracted towards a magnet

e.g/ iron, steel ~~nickel, cobalt~~ (dif yeh yaad rakhein)

non-magnetic materials: materials which are not attracted towards a magnet

e.g/ brass, wood, copper, glass

magnetized materials: materials which are able to stay magnetized for a long time

e.g/ permanent magnet

Properties of Magnet

→ they always attract magnetic materials

→ once suspended, it will always align itself in the North-South direction

→ like poles and unlike poles attract each other

→ the region around a magnet can also attract magnetic material (its magnetic field)

Experiment to compare magnetic properties of iron and steel

→ fix pieces of iron and steel at the ends of two magnets

→ dip them into iron filings

→ magnet A picks up large no. of iron filings as compared to magnet B

→ now separate the pieces iron and steel from their respective magnets

→ all iron-filings fall down from piece of iron and hardly any

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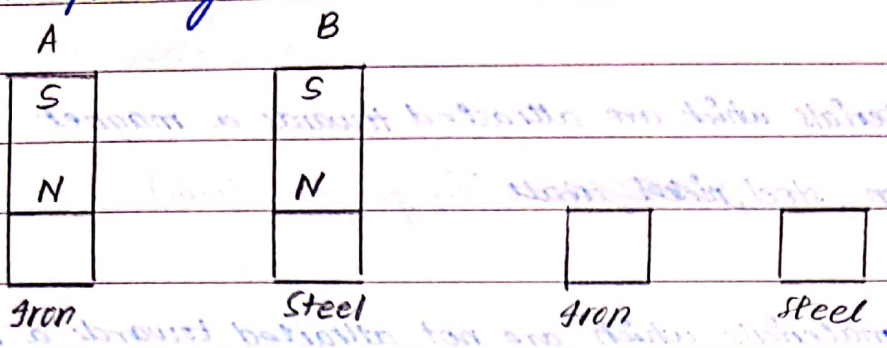
fall from piece of steel



Magnetic Properties of Iron	Magnetic Properties of Steel
→ can easily be magnetized and demagnetized	→ hardly magnetized and can remain magnetized for longer time
→ can be magnetized by a weak magnetic field	→ requires a strong magnetic field to magnetize
→ used to make temporary magnets	→ used to make permanent magnets
→ iron magnets are very strong	↔ steel magnets have less strength as compared to iron

(sirf attract kar leta hai kionkay demagnetize hojata hai field say bahir akay) (apni magnetic field bana letay hai) (attract + repel) → according to placement

Uses of Permanent Magnets

→ in making bar magnets
→ making needles of plotting compass
→ making magnetic door catchers
→ in devices like loudspeakers, motors, generators .etc.

Uses of Temperory Electromagnets

→ in magnetic shielding
→ in cranes to lift heavy pieces of iron/steel
→ in devices like electric bell, transformer, magnetic relay .etc

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induced magnetism : the process of inducing magnetism in a magnetic material, without any contact with the magnet (place a magnet near iron nails) (such as opposite pole is induced at the facing end)

electrical method of magnetization : a solenoid consists of copper coil, which is wound around a soft iron or steel core
when direct current is passed through the solenoid, the soft iron or steel core is strongly magnetized
(just for a few seconds the current is passed)

electrical method of demagnetization : place a magnet inside a solenoid and pass alternating current
slowly pull out the magnet from the solenoid
before switching off

Plotting of magnetic field lines with a compass

→ keep the plotting compass near the N-pole of the magnet
→ mark a dot where the needle points
→ shift the S-position of the needle on dot and mark a new dot where the compass now points
→ similarly, plot a series of marks from North to South pole of magnet
→ Join these dots
→ for accuracy, use a smaller plotting compass

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Use of magnetic screening

→ the process in which certain equipments or instruments are protected from the influence of magnetism (magnet appliance kay system ka part hai, screening karkay bahir ki magnetic field say bachana)

→ some equipments or instruments need a magnetism-free surrounding for proper operation

→ for this purpose, the given equipment is kept inside a soft iron ring (it is easily magnetized)

↳ can draw some neighboring magnetic field lines into itself

→ thus, the area within the soft iron has no magnetic field line

Use of magnetic materials in a computer hard disk drive

* steel core hogi solenoid mein bou ~~uska~~ wo demagnetise nahin hogi on turning off of current ~~why is it~~ which is why steel isn't an electromagnet
* iron is used instead b/c it will instantly demagnetize upon turning off of current

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Soft Iron :

→ misaligned di-poles

→ we stroke a magnet with the soft iron and it aligns the di-poles

→ another way would be to wrap a current carrying wire around it (becomes an electromagnet btw)

~~[illegible]~~

→ soft iron acts

Q. Why is soft iron core used inside an electric bell / solenoid?

→ when current passes through the wire, the iron core gets instantly magnetized to generate a strong and dense magnetic field (means it directs the field of lines through it giving a stronger magnetic field

→ the field of the wire penetrates the core material, magnetizing it, so that the strong magnetic field of the core can add to the field created by the wire

→ also, when the current is stopped, the iron core instantly demagnetizes

RHGR : curled fingers → conventional current (+ve to -ve)

thumb ↦ N-pole

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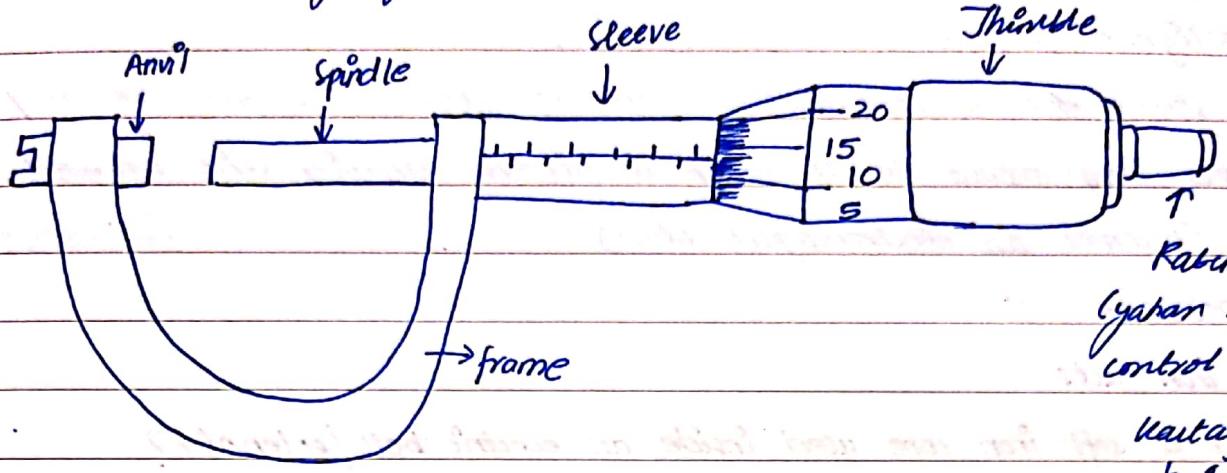
(a). Micrometer screwgauge

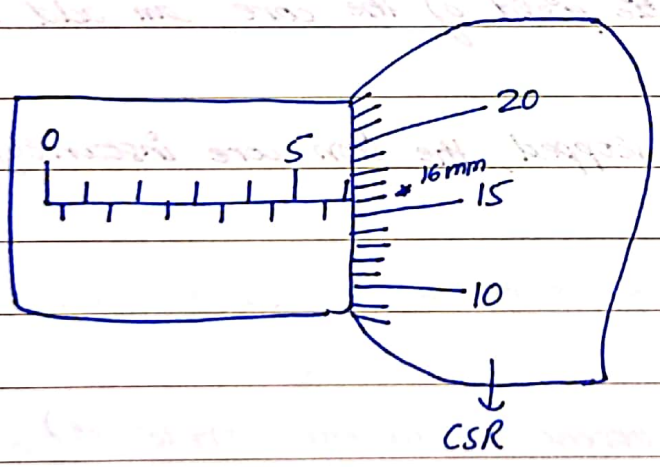


0.01mm – 25mm

Special use:

- Thickness of paper
- diameter of paper

Example:



Circular Reading

Main scale reading = 6mm

CSR = 16 × (0.01) =

= 0.16mm

Add = 0.16 + 6

= 6.16 mm

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Meter Rule

0.1cm to 100cm

→ straight length upto 100cm

Measuring Tape:

0.1cm to several meters

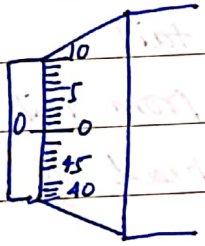
→ curved lengths

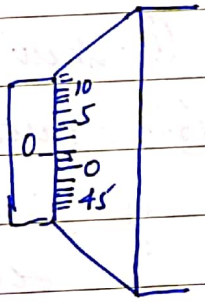
Parallax Error: line of sight is not perpendicular to mark on scale you are reading

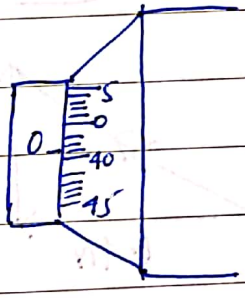
↳

↳ decrease the distance b/w object & ruler

Zero Error → anvil and spindle are closed but micrometer still shows reading







+ve zero error

jitna neeche ho utna × 0.01 has to be subtracted from final answer

-ve zero error

→ same but add in answer

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Vectors

→ physical quantity that have unit, magnitude & direction
e.g/ displacement, velocity, force, acceleration, movement.

(a). Parallel

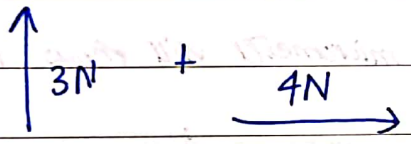
(1). $60N \rightarrow + 10N \rightarrow = 70N \rightarrow$

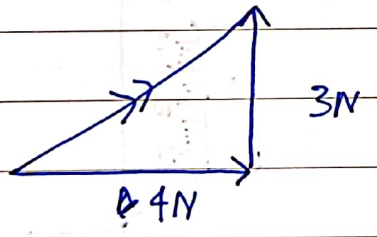
(2). $100m \rightarrow + 20m \leftarrow = 80m \rightarrow$

(3). $10m/s \rightarrow + 10m/s \leftarrow = 0°$

(b). Not Parallel
(jab angle ajaye vector nay darmayan)

e.g/





(1). draw head to tail
(2). resultant is from tail of first to head of second

o If vectors to be added are clockwise, the resultant vector will be anti-clockwise or vice versa

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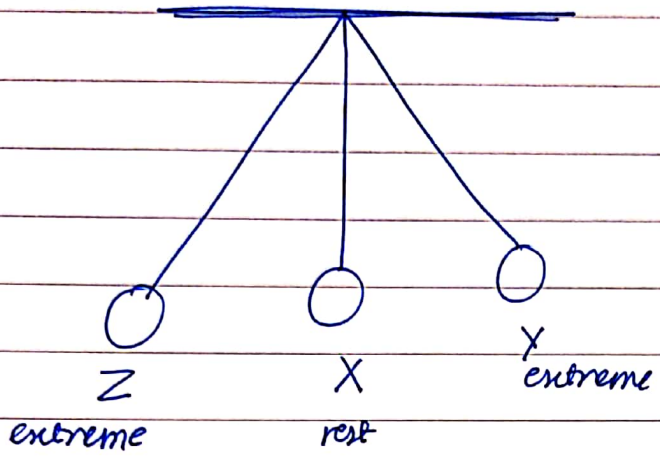
Simple Pendulum



Oscillation : $X \rightarrow Y \rightarrow Z \rightarrow X$

time taken to = $\frac{\text{time taken for N oscillation}}{\text{number of oscillation}}$