* Acceleration → Rate of change of Velocity

$$\therefore \boxed{a = \frac{v-u}{t}}$$

Unit → S.I. Unit of Acceleration → $m/s^2 = ms^{-2}$

→ C.G.S. Unit of Acceleration → $cm/s^2 = cms^{-2}$

* Linear- Momentum → The product of mass (m) and velocity (v) of a body is called Linear Momentum (P).

$$\therefore \boxed{P = mv}$$

S.I. Unit of Momentum = $Kg\,ms^{-1}$

C.G.S. unit of " " = $g\,cms^{-1}$

cceleration (a)

* **Force** →

(i) A Pull or Push is called Force

(ii) An External cause Which either brings changes or try to changes in shape - size or Position of a body Called **Force.**

(iii) The Product of Mass (m) and Acceleration (a) of a body is called **Force**

$$\therefore \boxed{F = ma}$$

* Linea

Unit of Force → $F = ma$

C.G.S. Unit

$F = g\,cm\,s^{-2} = dyne$

$1\,dyne = 1\,g \times 1\,cm\,s^{-2}$

A Force which acts on a body of mass 1 gm and produce an Acceleration of $1\,cm\,s^{-2}$, called 1 dyne.

S.I. Unit of Force

$F = Kg\,m\,s^{-2} = newton(N)$

$1\,N = 1\,Kg \times 1\,m\,s^{-2}$

A Force which acts on a body of mass 1 Kg and produce an Acceleration of $1\,m/s^2$, called 1 newton (1N).

Types of Force

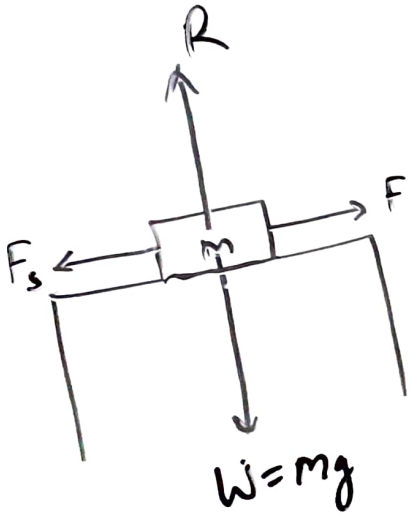
Contact-Force

A Force which works on a body by physicaly contact

like ① Friction Force (F_s) → Acting between two contact surfaces.

② Normal Reaction Force → (R)

③ Tension Force → (T)



Non-Contact Force

→ Without Physicaly contact it work on a body.

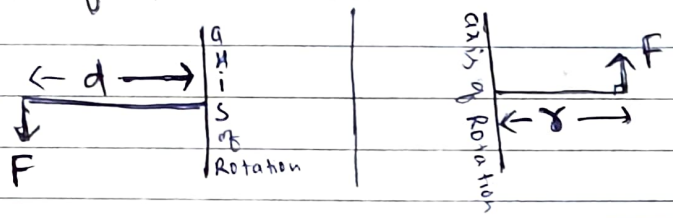
Ex ① Gravitational force

(ii) Magnetic Force

(iii) Electrostatic Force

Class-X Force

1. **Moment Of Force** → M.O.F define as product of force(F) and Perpendicular Distance betn Force (F) and axis of Rotation



Sonu sir

$$\boxed{\text{Moment of Force} = F \times r = F \cdot d}$$ Sonu sir

$$\boxed{M.O.F = F \cdot r = F \cdot d}$$ by Sonu sir

→ It's C.G.S Unit = dyne. cm.

→ S.I. Unit = N.m = newton.meter.

Relation betn S.I. and C.G.S. Unit.

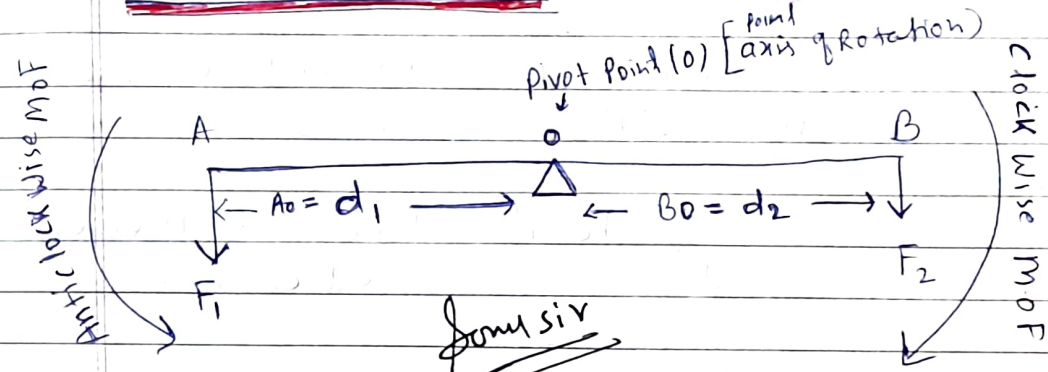
Sonu sir

$1 N m = 1 N \times 1 m$

$1 N \cdot m = 10^5 \text{ dyne} \times 100 \text{ cm}$

$$\boxed{1 N \cdot m = 10^7 \text{ dyne} \cdot \text{cm}}$$

* **Nature of M.O.F.** → Two Nature



Sonu sir

(i) Anticlock wise M.O.F = $F_1 \times d_1$ (↺)

(ii) clock wise M.O.F = $F_2 \times d_2$ (↻)

\# In Equilibrium state, When no-any movement

Sonu K. Gupta

Anti clock wise M.O.F = Clock wise M.O.F

$$\boxed{F_1 \times d_1 = F_2 \times d_2}$$ Sonu sir

Class- X

Force

* Principle of Moments

→ According to Principle of Moments in Equilibrium state,

Sum of the Anticlock wise moments equal to sum of clock wise moments

* Equilibrium →

When a number of Forces acting a body such that body does not any change in it's state either in Rest or Uniform Motion called, Equilibrium

Types of Equilibrium

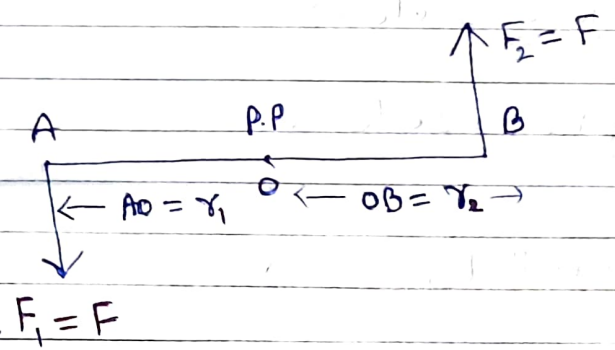
(a) **Static Equilibrium** → When a number of Forces acting on a body, and body Remain in it's Rest state called Static Equilibrium ex- A book on the table

(b) **Dynamic Equilibrium** → When a number of Forces acting on at body and body Remain in it's Uniform motion, called Dynamic Equilibrium- ex Falling rain drops

P.P = Pivot Point
(Point of axis of Rotation)

COUPLE → A pair of Forces Which acting on a body due to which body start rotational Motion.

→ When two Equal but opposite Forces acting on a body in opposite direction, then such pair of Forces Called Torque or moment of such pair of Forces called COUPLE.



M.O.F. at end A = $F_1 \times r_1 = F \times r_1$

M.O.F. at end B = $F_2 \times r_2 = F \times r_2$

Total moment of couple = $F \times r_1 + F \times r_2$

$= F(r_1 + r_2)$

Total moment of couple = $F \times AB = F \times d$

Pivot Point →

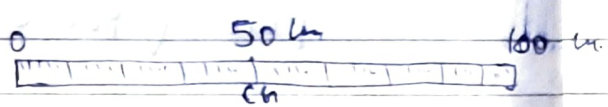
Centre of Gravity

↓

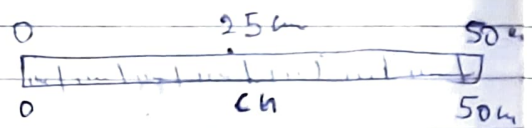
C.G

→ A Point inside a body where it's whole weight consider to be centroid or present maximum, called C.G..

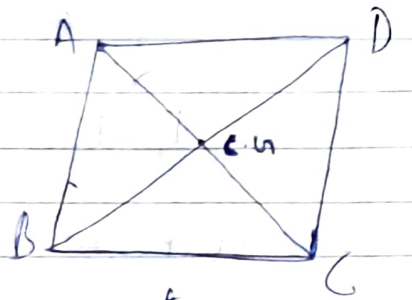
(a) 1. Meter Scale →



(b) Half meter Scale →

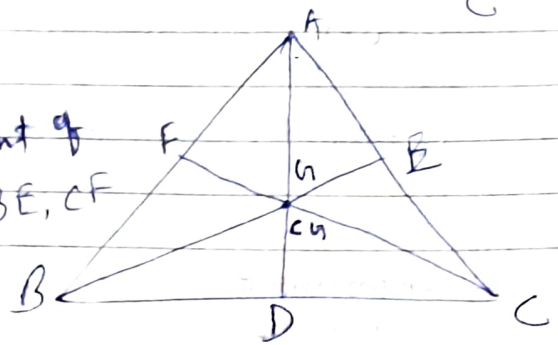


(c) Parallelogram →



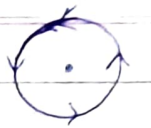
(d) Triangle →

→ Intersection point of medians AD, BE, CF at G



Class-X^th

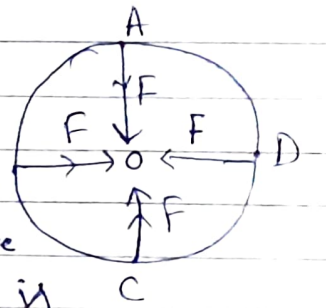
* **Circular Motion** →



→ When a body moves on a circular path, then it's motion is called circular Motion

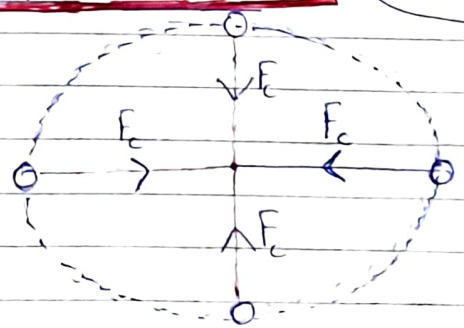
→ To move on a circular motion a special Force Required, called "Centripetal Force" → F_c

→ **Centripetal Force** →



→ A Force whose direction is always towards the centre of circular path, and it is cause of circular motion, called Centripetal Force $F_c = F_c$

→



class - X^th

WORK, POWER, ENERGY → FORCE

Sub. Physics

By. Sonu Kr. Gupta

1. Define Force.
2. Write S.I. and C.G.S. Unit of Force. and Relation between them.
3. State the condition when on applying a Force, the body has: (i) The translational motion (ii) The Rotational Motion
4. Define Moment of Force and State it's S.I. Unit.
5. State two Factors affecting the turning effect of a Force.
6. Define moment of couple. Write it's S.I. Unit. and C.G.S. Unit.
7. State the relation between the S.I and C.G.S Units of Moment of Force
8. Define gf and Kgf, the gravitational Unit of Force.
9. State the mathematical Expression for the moment of couple
10. When is the moment of Force taken positive and Negative?
11. Difference between translational motion and rotational Motion.
12. Define the term "turning Force".
13. Define the term "equilibrium of a body".
14. State the conditions for a body to be in Equilibrium.
15. State the principle of moment. Give one application of it.
16. What do you Understand by the term "centre of gravity" of a body
17. Define the term Centripetal Force.
18. Define the term Centrifugal Force.
19. Write the Difference between Centripetal Force and Centrifugal Force.
20. State two Factors that determine the moment of Force.
21. A Screw Jack is provided with a long arm. Give reason