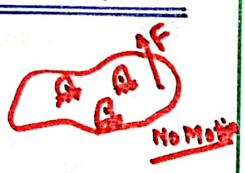
APPLIED MECHANICS

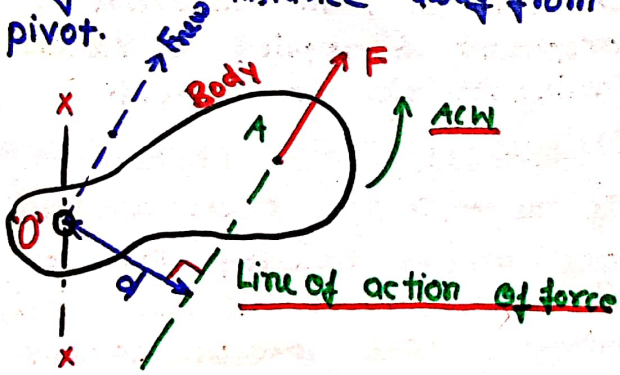
(UNIT- II) "MOMENT AND COUPLE"

MOMENT



The moment of a force is a measure of its tendency to cause a body to rotate about a specific point or axis.

The Moment is equal to the force applied by the distance away from the pivot.



F → force (N)

d → ⊥r distance of line of action of force from 'O'.

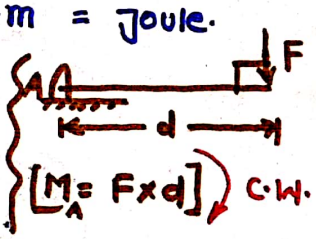
∴ [Moment = Force x Distance]

$$M = F \times d$$ N-m = Joule.

C.G.S. → gm-cm

M.K.S. → Kg-m

S.I. → N-m.



NOTE :- Moment of force will be zero about an axis or point if -

(I) The force is zero. ⇒ (M = 10 N-m) M = 5N x 2m, M = 10 N-m

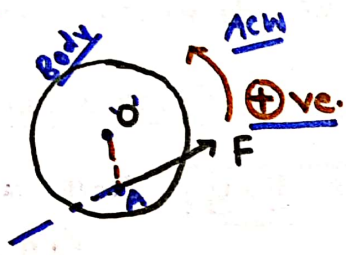
(II) Line of action of force passing through same point or axis.

Example of Moment :- Doors handle.

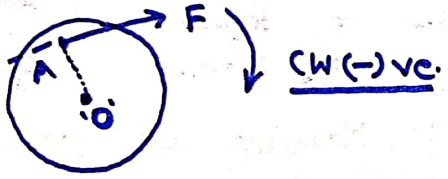
$M_{new} = 5N \times 3m = 15$ N-m

Types of Moment & sign Convention:-

(1) A.C.W. :-



(2) C.W. :-



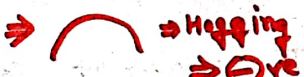
"You can take reverse also."

Classification of Moments:-

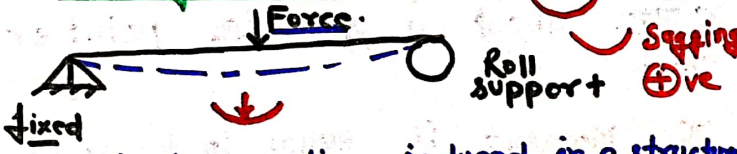
(1) Turning moment.
(2) Bending moment.
(3) Twisting moment.

(1) **Turning Moment:-**

When the body is free to rotate at its support or pivot then Moment generated by the force is called turning Moment.



(2) **Bending Moment:-** (N-m)



A B.M. is the reaction induced in a structural element when an external force or moment is applied to the element causing the element to bend.

(3) **Twisting Moment:-** (N-m)

If the ends of a beam are held and one end is twisted C.W. or A.C.W. then this B.M. is called twisting moment (or) Torsion Moment or torque.