## PRINCIPLE OF MOMENT AND ITS APPLICATION :-

(B.T.E.U.P. 2004)

**LEVERS** : Simple Machine Consisting of a beam or rigid rod pivoted at a fulcrum.

A lever is a rigid rod capable of rotating on a point.

→ By applying effort it can control load.

→ Distance between fulcrum to effort and fulcrum to Weight is called lever's arm.

On the basis of locations of fulcrum, load, effort the lever is divided into three types -

1- Class - I
2- Class - II
3- Class - III

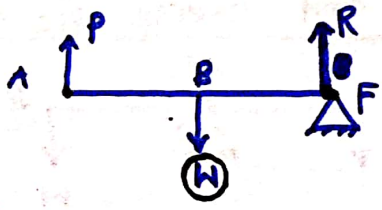
(1) Class - (I) :-

Let F → Fulcrum
W → Load
P → Effort


In this type the fulcrum is between load and effort. (Scissor, Balance, Seesaw)

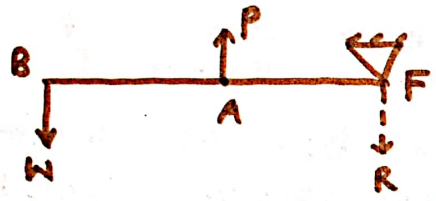
(2) Class - (II) :-

In this type the load is between effort and fulcrum.




examples :- Nutcracker, Helm

(3) Class-III :- In this effort is between load and fulcrum.




examples :- clip, Tongs.

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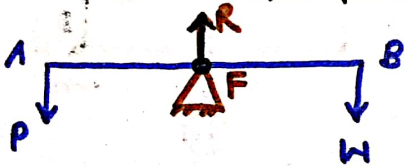
-☼- M.A. and leverage of a lever :-




Lever is balanced due to P and W.

Hence $\Sigma M_F = 0$

$+(P \times AF - W \times BF) = 0$

$P \times AF = W \times BF$

$$\left[\frac{W}{P} = \frac{AF}{BF} = \frac{\text{effort Arm}}{\text{Load Arm}} = M.A.\right]_{\#}$$

Leverage :-

It is the ratio of Effort Arm to the load arm.

$$\text{leverage} = \frac{\text{effort Arm}}{\text{load Arm}} = \frac{AF}{BF}$$

Hence;

$$\left\{M.A = \text{leverage} = \frac{W}{P} = \frac{AF}{BF}\right\}_{//}$$