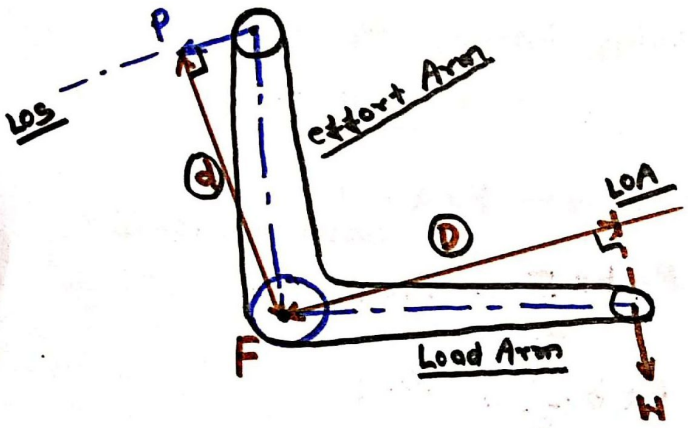
BELL- CRANK LEVER:-



- There is some inclination angle between in effort arm & load arm.
- Hence LOA of effort is not parallel to LOA of load.
- Used in Machines.

Draw ⊥r from F to P and W.

taking Moment about F - ($\Sigma M_F = 0$) :-

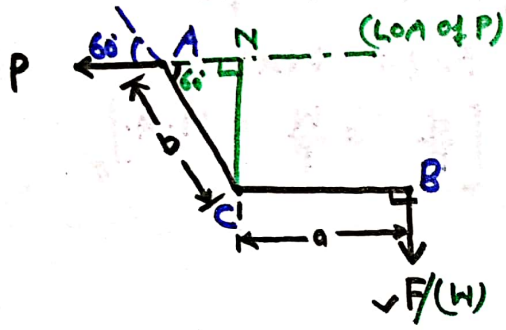
$(+P \times d - W \times D) = 0$

$P \times d = W \times D$

$\left[\frac{d}{D} = \frac{W}{P} = M.A.\right]_{\#}$

B.T.E.U.P. 1984

Question:- Find the effort P in the lever as shown-



Solve:-

Considering $\triangle ACN$-

$$\sin 60^\circ = \frac{CN}{AC}$$

$$CN = AC \times \sin 60^\circ$$

$$CN = b \times \frac{\sqrt{3}}{2} \quad \text{— (1)}$$

In equilibrium Condition,

Taking Moment About C

$(\Sigma M_C = 0)$:-

$$+P \times CN - F \times a = 0$$

from equation (1)-

$$P \times b \times \frac{\sqrt{3}}{2} = F \times a$$

$$P \times b \frac{\sqrt{3}}{2} = F \times a$$

$$\left\{ P = \frac{2}{\sqrt{3}} \cdot \left(\frac{F \cdot a}{b} \right) \right\} \text{ Ans.}$$