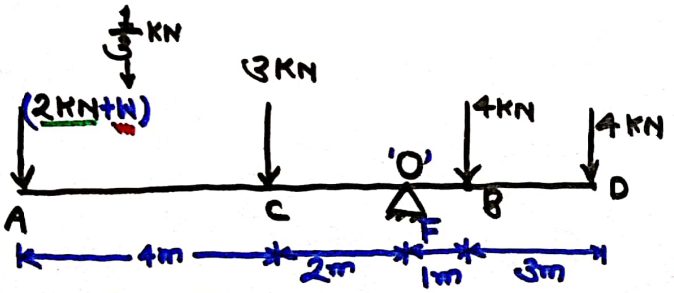
B.T.E.U.P. 2005

Question :- According to diagram different vertical load is acting at fulcrum point 'O'. What will be effect on equilibrium of lever? Find the additional load on point A to get equilibrium again.



To find :- (i) To check equilibrium Condition
(ii) W = ? (KN).

(i) $\Sigma M_o = 0$:-

A.C.W. :-

$= +2 \times 6 + 3 \times 2$

$= 18$ KN-m. ↺

C.W.

$= 4 \times 1 + 4 \times 4$

$= 20$ KN-m ↻

∵ A.C.W M. ≠ C.W. M

∴ It is not in equilibrium. //

(ii) Net Moment

20 ↻ − 18 ↺ = 2KN-m ↻

* $\Sigma M_o = 0$:-

$+2 \times 6 + 3 \times 2 - 4 \times 1 - 4 \times 4 = 0$

$18 - 20 \neq 0$

Net moment $= -2 \neq 0$ KN-m (2KN-m ↻)

(ii) A.C.W. Moment = C.W. Moment

$(2+W)\times 6 + 3\times 2 = 4\times 1 + 4\times 4$

$12 + 6W + 6 = 4 + 16$

$W = \frac{2}{6}$

$W = \frac{1}{3}$ KN

$[W = 0.3333 \text{ KN}]$ Ans.