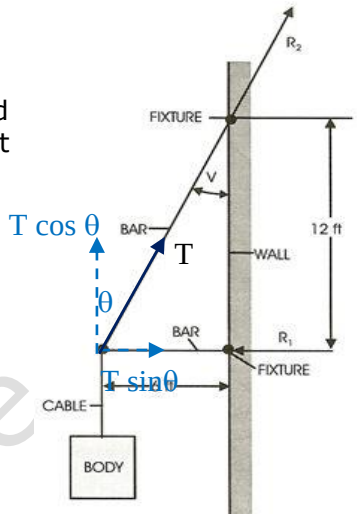
Q- A body (weight 3000N) is supported by a bracket through a vertical cable. The bracket is composed of a horizontal bar and an inclined bar, both are rigidly fastened to the wall. Neglecting the weight of the bars and the cable, determine the magnitude of the reaction R_1 exerted by the lower fixture on the horizontal bar.



Let the tension in the inclined bar is T then resolving it horizontally and vertically we get the vertical component is T cos θ which balances the weight of the body i.e.

$T \cos \theta = W$ ---------- (1)

And the horizontal component of the tension in the bar is balanced by the reaction of the lower fixture R_1 hence

$T \sin \theta = R_1$ ---------- (2)

Dividing (2) by (1) we get

$\tan \theta = R_1/W$ ---------- (3)

Now we can get the value of tan θ from the right-angled triangle from by the cable as

$\tan \theta = 6/12 = 0.5$

Substituting the values in equation (3) we get

$0.5 = R_1/3000$

Gives $R_1 = 3000*0.5 = 1500$ N