MECH 236

PROB 12.36
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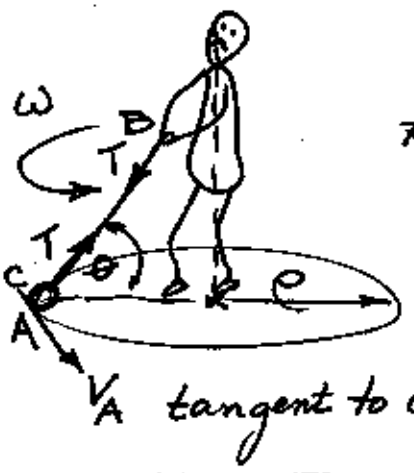


$m_A = 7.1\ kg$

REVOLVES at CONSTANT SPEED

$V_A = ?$

$\rho = 0.93\ m$ = RADIUS OF CIRCLE

$\theta = 60°$ BETW. HOR. & $\overline{BC}$

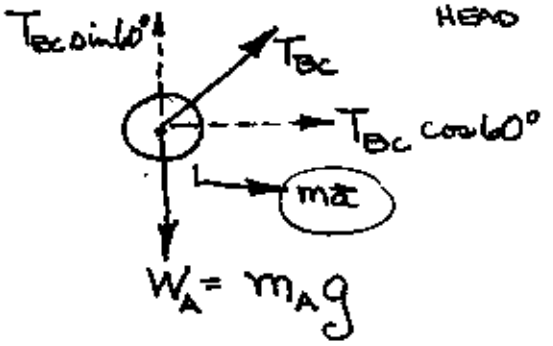
V_A tangent to circle a) T_{BC} b) V_A

CONSTANT SPEED ∴ NO ANG. ACC. ∴ $A^t = 0 = \alpha\rho$

CENTRIPETAL ACC = $A^n = \vec{\omega} \times (\vec{\omega} \times \vec{\rho}) = \omega^2 \rho = \frac{V^2}{\rho}$

MASS IN MOTION = HAMMER HEAD

∴ $\Sigma \vec{F}_{\text{on HAMMER HEAD}} = m_A \vec{a}$



$\Sigma \vec{F}_Y = m\vec{a}_Y^{\,0}$

$+T_{BC}\sin 60° - W_A$

$T_{BC} = \dfrac{(7.1\ kg)(9.81\ \frac{m}{s^2})}{\sin 60°} = 80.43^N.$

$\boxed{T_{BC} = 80.43^N}$

$\Sigma \vec{F}_x = m\vec{a}_x^{\,n}$

HORIZ. FR.

$T_{BC}\cos 60° = (7.1\ kg)\left[\dfrac{V_A^2}{0.93m}\right]$

$\dfrac{80.43^N \cos 60° (0.93m)}{(7.1\ kg)} = V_A^2$ ∴ $V_A = 2.295\sqrt{\frac{kg\,m}{g\,s^2}\,\frac{m}{kg}}$

DON'T FORGET TO √ !

$\boxed{V_A = 2.3\ \frac{m}{Sec.}}$