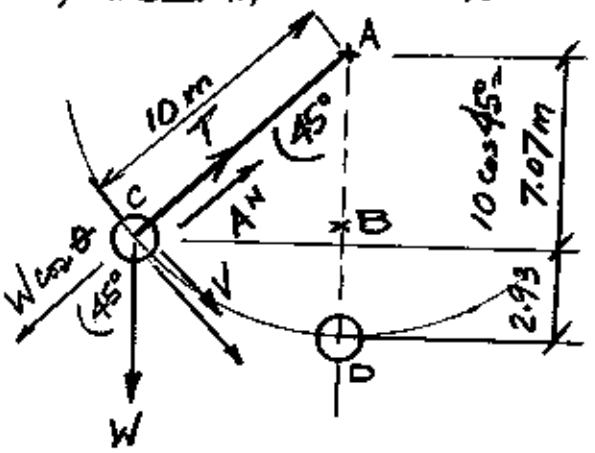
HIBBELER

14-81

TARZAN SWINGS LIKE A PENDULUM.



$m = 100\,kg$

$W = 981\,N.$

I.C. AT REST

$\Delta h = -2.93\,m.$

$\text{WORK} = Fd = Wd = 981^N(-2.93m)$

(a.) AT THE TIME HE JUST HITS THE TREE (TARZAN MORE LIKE "GEORGE of the JUNGLE")

$$PE_C + KE_C = PE_D + KE_D$$

$$\Delta PE_{1-2} = \Delta KE \Big]_0^V$$

$$(981^N)(+2.93m) = \frac{1}{2}(100kg)V^2 \quad \therefore \boxed{V_D = 7.582\,\frac{m}{s}}$$

$$\Sigma F_n = m a^N$$

$$T - W\cos\theta = (100kg)\frac{V^2}{\rho} \qquad \text{where } \rho = 10\,m \text{ just after pt. C}$$

$$T = 981^N\cos 45^\circ + \frac{(100kg)(7.58\,m/s)^2}{10\,m} = 1.269\,kN$$

$$\boxed{T \approx 1.27\,kN}$$

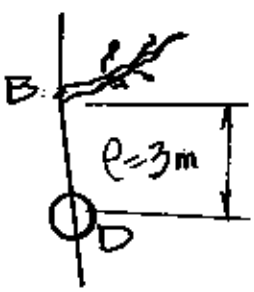
JUST BEFORE THE TREE:

$$\Sigma F = m a^N$$

$$T - W = (100kg)\frac{V^2}{\rho}$$

$$T = 981^N + \frac{(100)(7.58)^2}{10\,m} = \boxed{T = 1.56\,kN}$$

(b) AFTER HE HITS THE LIMB, HE KEEPS SWINGING!



$$T = 981 + \frac{(100kg)(7.58)^2}{3m} = 2.891\times10^3$$

$$\boxed{T = 2.9\,kN}$$