14. To find the center of mass speed v on the plateau, we use the projectile motion equations of Chapter 4. With $v_{oy} = 0$ (and using "h" for h_2) Eq. 4-22 gives the time-of-flight as $t = \sqrt{2h/g}$. Then Eq. 4-21 (squared, and using d for the horizontal displacement) gives $v^2 = gd^2/2h$. Now, to find the speed v_p at point P, we apply energy conservation, i.e., mechanical energy on the plateau is equal to the mechanical energy at P. With Eq. 11-5, we obtain

$$\frac{1}{2}mv^2 + \frac{1}{2}I_{com}\,\omega^2 + mgh_1 = \frac{1}{2}mv_p^{\,2} + \frac{1}{2}I_{com}\,\omega_p^{\,2}$$

Using item (*f*) of Table 10-2, Eq. 11-2, and our expression (above) $v^2 = gd^2/2h$, we obtain

$$gd^2/2h + 10gh_1/7 = v_p^{\,2}$$

which yields (using the values stated in the problem) $v_p = 1.34$ m/s.