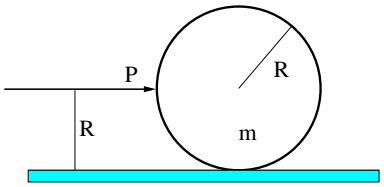
[mex220] From sliding to rolling motion

A billiard ball (rigid homogeneous sphere of mass m and radius R) is initially at rest on a flat table. A cue then imparts a horizontal impulse of magnitude P in a very short time at height R. The coefficient of kinetic friction between table and ball is μ.
(a) Find the time t_r that elapses before the motion of the billiard ball turns into pure rolling.
(b) Find the speed v_r of the rolling billiard ball.



Solution: