

Find the differential equation of motion of a raindrop falling through a mist collecting mass as it falls. Assume that the drop is spherical and that the rate of mass collection is $\frac{dm}{dt} = bvA$ wherein b is a constant, v is the speed, and A is the cross-sectional area. Show that if the drop starts from rest and infinitesimal size, then the acceleration is constantly $\frac{g}{7}$.