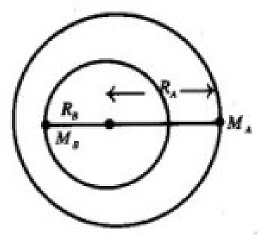

Taking assumptions as in diagram. Applying angular momentum conservation about center of mass:

$$M_a V_a = M_b V_b \tag{1}$$

Using gravitational law:

$$\frac{G M_a M_b}{(r_a + r_b)^2} = M_a \frac{v_a^2}{r_a} \tag{2}$$

$$\frac{G M_a M_b}{(r_a + r_b)^2} = M_b \frac{v_b^2}{r_b} \tag{3}$$

Assuming circular motion and time period as T, we also have:

$$T V_a = 2\pi r_a \tag{4}$$

$$T V_b = 2\pi r_b \tag{5}$$

Also,

$$\frac{2\pi}{T} = \frac{V_a}{r_a} = \frac{V_b}{r_b} \tag{6}$$

Putting (6) in (2) and (3). Then using (4), (5) to get rid of r_a, r_b. We finally get:

$$M_a = \frac{V_a (V_a + V_b)^2 T}{2\pi G} \tag{7}$$

$$M_b = \frac{V_b (V_a + V_b)^2 T}{2\pi G} \tag{8}$$