

$$t = 1.77 \text{ days} \cdot \frac{24 \text{ hrs}}{1 \text{ day}} \cdot \frac{3600 \text{ sec}}{1 \text{ hr}}$$

$$t = 153,000 \text{ sec}$$

$$r = 4.22 \times 10^5 \text{ km} = 4.22 \times 10^8 \text{ m}$$

Find V_t of I_o :

$$V_t = \frac{2\pi r}{t} = \frac{2\pi (4.22 \times 10^8 \text{ m})}{153,000 \text{ sec}}$$

$$V_t = 17,300 \text{ m/s}$$

Find mass of Jupiter:

$$F_c = F_g$$

$$\frac{m_{I_o} \cdot V_t^2}{r} = \frac{G \cdot m_J \cdot m_{I_o}}{r^2}$$

$$V_t^2 = \frac{G \cdot m_J}{r}$$

$$(17,300 \text{ m/s})^2 = \frac{G \cdot m_J}{(4.22 \times 10^8 \text{ m})}$$

$$m_J = 1.90 \times 10^{27} \text{ kg}$$