

3.) A SATELLITE ORBITS EARTH AT ALTITUDES OF 5000km. WHAT IS ITS SPEED W/ RESPECT TO THE CENTER OF EARTH?

$$\bullet r_e = 6380 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} = 6,380,000 \text{ m}$$

$$\bullet \text{MASS} = 5.98 \times 10^{24} \text{ kg}$$

$$\begin{aligned} \bullet F &= m \cdot a_r \rightarrow G \frac{m_{\text{sat}} \cdot m_e}{r^2} = m_{\text{sat}} \frac{v^2}{r} \\ \rightarrow v^2 &= G \frac{m_e}{r} \rightarrow v = \sqrt{G \frac{m_e}{r}} \\ &= 5920.3 \end{aligned}$$

$$\bullet r = r_e + h = 6.38 \times 10^6 + 5.00 \times 10^6 = 1.138 \times 10^7 \text{ m}$$