

43. $v = ?$ (circular orbit)

$$aH = 160 \text{ km} \quad r = 6.53 \text{ E } 6 \text{ m}$$

$$M_E = 5.98 \text{ E } 24 \text{ kg}$$

$$\Sigma F_c = \frac{mv^2}{r}$$

$$G \frac{M m}{r^2} = \frac{mv^2}{r}$$

$$G \frac{M}{r} = v^2$$

$$\sqrt{G \frac{M}{r}} = v$$

$$\sqrt{\frac{G(5.98 \text{ E } 24)}{6.53 \text{ E } 6}} = v$$

$$7816 \text{ m/s} = v$$

b) $T = ?$

$$v = \frac{2\pi r}{T}$$

$$T = \frac{2\pi r}{v} = \frac{2\pi(6.53 \text{ E } 6)}{7816}$$

50.

$$T = 86400 \text{ s (one day)}$$

$$alt = ?$$

$$v^2 = \frac{GM}{r}$$

$$\left(\frac{2\pi r}{T} \right)^2 = \frac{GM}{r}$$

$$4\pi^2 r^3 = GM T^2$$

$$r = \sqrt[3]{\frac{GM T^2}{4\pi^2}}$$

$$r = \sqrt[3]{\frac{G(5.98 \times 10^{24})(86400)^2}{4\pi^2}}$$

$$r = 4.23 \times 10^7 \text{ m}$$

$$\text{alt} = 3.59 \times 10^7 \text{ m}$$