

48. To “hover” above Earth ($M_E = 5.98 \times 10^{24}$ kg) means that it has a period of 24 hours (86400 s). By Kepler’s law of periods,

$$86400^2 = \left(\frac{4\pi^2}{GM_E} \right) r^3 \implies r = 4.225 \times 10^7 \text{ m} .$$

Its altitude is therefore $r - R_E$ (where $R_E = 6.37 \times 10^6$ m) which yields 3.59×10^7 m.