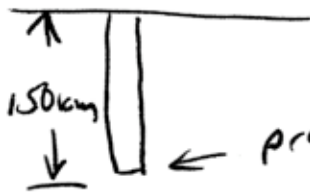


①



pressure for diamonds = $\rho g h$

press in center of body

$$\rho g h = \frac{2\pi G \rho^2 R^2}{3} = 1.4 \times 10^{-10} \rho^2 R^2$$

$$R^2 = \frac{g h}{1.4 \times 10^{-10} \rho} = \frac{(9.8)(1.5 \times 10^5)}{1.4 \times 10^{-10} \cdot 3500}$$

$$R = 1700 \text{ km}$$

②

$$p = p_0 e^{-z/H} \quad ; \quad H \equiv \frac{kT}{g \mu M_H} = \frac{(1.38 \times 10^{-23})(300)}{(9.8)(28)(1.67 \times 10^{-27})}$$

$$= 9 \text{ km}$$

$$\frac{p}{p_0} = e^{-5/9} = \underline{\underline{.57}}$$

③

$$H = (9 \text{ km}) \left(\frac{28}{44} \right) = 5.7 \text{ km for CO}_2 \text{ atmosphere}$$

$$\frac{p}{p_0} = \underline{\underline{.42}}$$

④

$$H \equiv \frac{kT}{g \mu M_H}$$

Higher $T \Rightarrow$ higher scale height

higher scale height \Rightarrow lower pressure gradient
 \Rightarrow the pressure at the higher