补充题

1. $V_{S1} = \left(\frac{P_1}{\rho_1}\right)^{0.5}$ $\quad V_{S2} = \left(\frac{P_2}{\rho_2}\right)^{0.5}$

$$\frac{V_{S1}}{V_{S2}} = \left(\frac{P_1\rho_2}{P_2\rho_1}\right)^{0.5} \approx 0.457$$

2. (1) $E = 7.1m \times 2.6m \times 1368 W/m^2 \times 300s$

$= 7575984 J$

(2) $P = 7.1m \times 2.6m \times 1368 W/m^2 \times 0.25$

$= 6313.32 W$

3. $\begin{cases} \lambda_{max} = \dfrac{2.897 \times 10^{-3}}{T} \\ E = \sigma A T^4 \\ A = 4\pi (3R_0)^2 \end{cases} \Rightarrow E = 6.916 \times 10^{20} W$

1. $\lambda_{max} = \frac{2.897\times10^{-3}}{T} \Rightarrow T = 3621.25\,K$

2. $\begin{cases} E = \sigma A T^4 \\ A = \pi D^2 \end{cases} \Rightarrow T \approx 3129.69\,K$

3. $A' = 9A \quad T' = 3T$

$E = \sigma A' T'^4$ 故总亮度是太阳的 3^6 倍

4. $E = 4\pi r^2 \cdot 290\,W\cdot m^{-2} \approx 1.458\times10^{26}\,W$

$\begin{cases} D = 2\pi r \cdot \frac{23}{60\cdot360} \\ E = \sigma A T^4 \\ A = \pi D^2 \end{cases} \Rightarrow T \approx 4623.89\,K$

5. 恰为全食时距离为 d_0 则 $\frac{d_0}{r} = \frac{R_M}{R_S}$

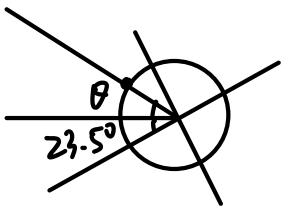
$d_0 \approx 374978\,km$

$C = ae \simeq 21526\,km$

近地点 $d_1 = a - C = 362875\,km < d_0$ 为全食

远地点 $d_2 = a + C = 405927\,km > d_0$ 为环食

6.



$E = 1370\,W/m^2 \cdot S \cdot \cos\theta$

$E = mc^2 \quad n = \frac{m}{m_0}\cdot 2$ $\Rightarrow n \approx 1.554\times10^{21}$