1. The solar hydrogen fuel will eventually get exhausted. The stellar core material contracts to increase the internal pressure to balance the gravitational forces. Assuming the stellar core material follows the ideal gas law, at what temperature will the CNO energy production be equal to the energy production by the pp-chains?

2. Calculate the Planck function $B_\lambda(T)$ and the wavelength $\lambda_{\text{max}}$ for maximum radiation emission for earth assuming an average surface temperature of 280K.