1. Consider the flat Universe with $\Omega_d = 0.3$, $\Omega_r = 8 \times 10^{-5}$, $\Omega_\Lambda = 0.7$ and assume $H_0 = 72 \text{km/s/Mpc}$. The recombination process has finished for $z = 1100$.

   (a) Compare the temperature at the end of the recombination process with the binding energy of hydrogen atom.
   
   (b) Calculate $z$ at the end of radiation era.

2. Calculate the time when the recombination process has finished.

3. Introduce the definition of the particle horizon, explain the difference between even horizon and the particle horizon and calculate the radius of the particle horizon for a) $a(t) = (t/t_0)^{2/3}$, b) $a(t) = (t/t_0)^{1/2}$.

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