(1) Describe the evolution of the Sun in time, in terms of its temperature, size, and color.

(a) What was it like 3 billion years ago?

(b) What will it be like 3 billion years from now?

(c) About how many years total will the Sun burn H on the main sequence?

(d) How will the Sun end its life?

(2) If gravitational contraction supplies Sun’s energy, describe your strategy for finding out how long the Sun could burn. Be specific.

(a) Explain with words:

(b) Explain with simple equations. Label all quantities. No numbers necessary.

(3a) What does hydrostatic equilibrium mean to you, in words?

(b) What two forces must balance in hydrostatic equilibrium? Write a simple equation describing this relationship.

(c) What does the term on the left side of this equation mean? \( \frac{d}{dr} (2nkT) = -\frac{GMm_p n}{r^2} \)

(d) What does the term on the right mean? (Let M=M_{sun})

(e) Solve the equation above for n(r). Hint: Let a=2kT and b= -GMm_p be constants. Use the back.