

Physics 20083 – Spring 2007 Exam #2b

Instructions:

1. Answer the following four questions in the space provided. If you need extra space, please use the back of the page and make an appropriate notation on the front of the page so that I will know where to look for your complete answer.
2. Each question is worth a total of 25 points.
3. Each question requires an answer that is typically no more than two or three sentences long or perhaps a diagram and one or two sentences. Some questions do not require explanations. This will always be explicitly stated.
4. You may **not** use your own paper, book, notes or a calculator for this exam.
5. You will have 30 minutes to complete the exam and turn it in.

$$\text{Energy-Wavelength Relation:} \quad E \propto \frac{1}{\lambda}$$

$$\text{Continuous Radiation} \quad : \quad T \propto \frac{1}{\lambda_{\text{peak}}}$$

$$\text{Parallax Angle (p)} \quad = \quad \frac{\text{Baseline}}{\text{Distance to object (r)}}$$

$$\text{Inverse Square Law:} \quad L_{\text{app}} \propto \frac{L_{\text{abs}}}{r^2}$$

$$\text{Density Equation:} \quad \text{Density (} \rho \text{)} \propto \frac{M}{R^3} \quad R = \text{Radius (size)}$$

$$\tan [\text{Angular Size (A)}] \quad = \quad \frac{\text{Radius or linear size (R)}}{\text{Distance to object (r)}}$$

#1. One of the readings assigned to you for this part of the course was "Philosophy and the Scientific Method" by Ronald Pine. In the reading, Pine talks about scientific and non-scientific theories. Explain below (a) the main quality that separates scientific from non-scientific theories and (b) the primary weakness of a system of knowledge that relies on non-scientific beliefs.

#2. Energy in the envelope of the Sun is transported in two different ways before finally leaving the Sun through the photosphere.

a) (13 pts) Explain why energy travels differently in the radiative zone of the Sun compared to the convective zone of the Sun.

b) (12 pts) Explain why the photosphere exhibits the phenomenon known as limb darkening. A diagram would greatly help your answer here.

