

Homework #7: Stars

Physics 1040: Elementary Astronomy

Score: _____/41

Name: _____

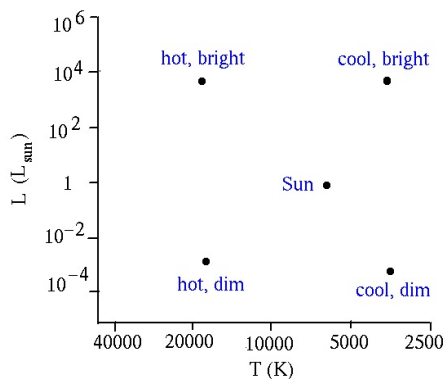
Dr. Sohl

Due date: Wednesday, April 16, 2008

Part 1. Definitions. Make the *best* match from the following words with the definitions below.

absolute magnitude	fission	nurseries
apparent magnitude	fusion	OBAFGKM
binary star	giant	radial velocity
center of mass	H-R diagram	red giant
clusters	inverse-square law	red supergiant
core hydrogen burning	light curve	spectral classification
core helium burning	luminosity	stellar evolution
$E=mc^2$	luminosity class	supergiant
eclipsing binary	main sequence	visual binary
	mass-luminosity relation	white dwarf

1. Young stars form near each other. These young stars become part of star... 1 _____
2. Star-forming nebulae (typically red with dark regions) are also known as stellar... 2 _____
3. As stars age and move around on the H-R diagram, the path they follow is known as... 3 _____
4. We use these star systems to determine the mass of stars. (Select the *most general* term.) 4 _____
5. One way to determine the mass of a star is if you know the luminosity. You then use the... 5 _____
6. The energy for stars on the main sequence is a result of ---- ----- burning. 6 _____
7. A concise and precise description of how much energy is produced by a nuclear reaction. 7 _____
8. When two stars orbit each other so that one moves in front of the other we call it an... 8 _____
9. Velocity along the line of sight is the... 9 _____
10. The spectral types (classification) of stars in order of temperature. 10 _____
11. When any two objects orbit each other, they actually orbit around the common... 11 _____
12. A measure of how visually bright an object is to your eyes as viewed from Earth. 12 _____
13. A measure of how bright an object is if it were viewed from a standard distance of 10 pc. 13 _____
14. Stars typically located in the bottom left area of an H-R diagram. 14 _____
15. Stars typically located in the top right area of an H-R diagram. 15 _____
16. The line of stars that snakes across the HR diagram from upper left towards lower right. 16 _____
17. Our current nuclear power plants on earth use nuclear XXXX which is not what stars do. 17 _____

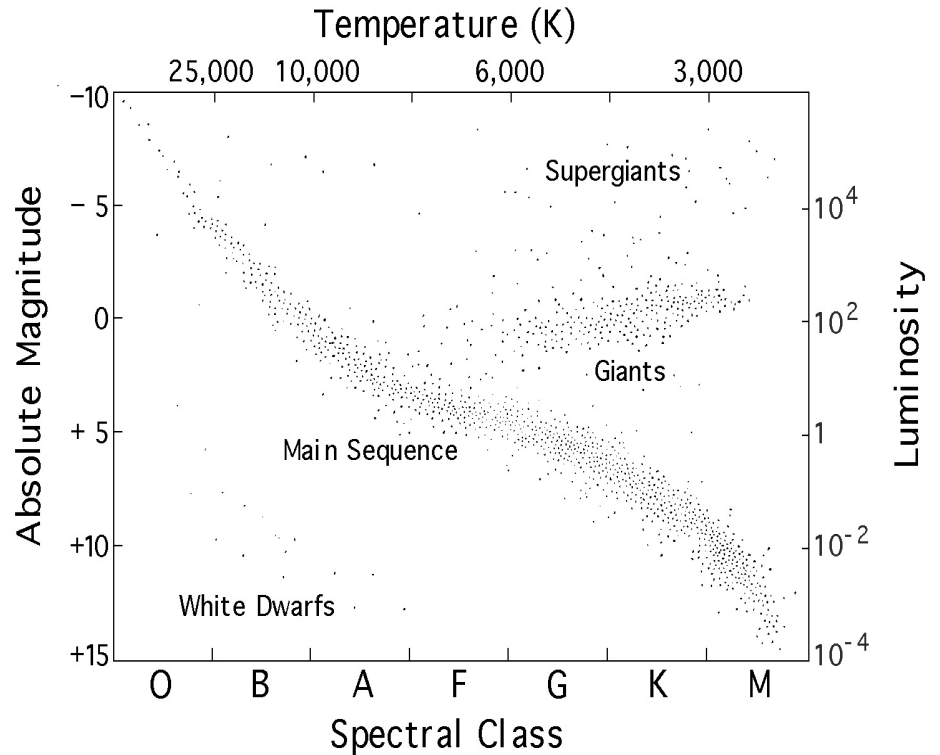


18. We study eclipsing binaries by watching their... 18 _____
19. The total radiative power output of a star. 19 _____

Figure: An H-R Diagram. (Davison E. Soper, Institute of Theoretical Science, University of Oregon)

Part 2. Questions (2 points each, except as noted)

1. (4 points) On the H-R Diagram shown here, draw the evolutionary path of a star like our Sun. Note the key features. (Figure from: http://imagine.gsfc.nasa.gov/docs/science/know_12/stars.html)



2. (2 pts) The star Rigel has an apparent visual magnitude of 0.12 (call this m_1) and the star Betelgeuse has an apparent visual magnitude of 0.50 (call this m_2), both of these stars are in the constellation of Orion. How much brighter does Rigel appear than Betelgeuse? You can determine the ratio of apparent brightness by using the relation:

$$\frac{b_1}{b_2} = 2.5^{(m_2 - m_1)} .$$

Show your work.

2. _____

3. Describe the difference between nuclear fusion and nuclear fission.

4. Absolute magnitude can be calculated from a star's apparent magnitude and XXXX. 4. _____

5. The spectral type of a star is another way of describing what property of the star? 5. _____

6. A parsec (pc) is a measure of distance. How many lightyears are in a parsec? 6. _____

7. If a high mass star starts off with more fuel than a low mass star, how come the high mass star doesn't live as long as the low mass star?

8. What was the first clue that told us that the Sun can't possibly be burning fuel in the "normal" way that we are familiar with here on Earth? 8. _____

9. Star A and star B both have the same luminosity, but star A is three times as far away. How much brighter is star B than star A? 9. _____

10. What one basic property determines almost everything about a star such as where a star will be along the main sequence, its luminosity, its evolution and fate? 10. _____