Astronomy 120 Spring 2019

Pre-Midterm Practice Exam

Problems (28 points)

- 1. The Whirlpool Galaxy M51 appears to extend 0.05 degrees on the sky. If it is 50,000 light years in diameter, how far away is it in light years?
- 2. How many kilograms of hydrogen must be converted into helium each second to account for the energy output of the Sun?

Short Answer (10 points)

- 1. What role does Iron play in the evolution of massive stars?
- 2. Why does a Red Giant star become so large?

Multiple Choice (20 pts)

1) The distance to the nearest star (other than the Sun) is a) 250 times greater than the distance to the Sun b) 2,500 times greater than the distance to the Sun c) 25,000 times greater than the distance to the Sun d) 250,000 times greater than the distance to the Sun 2) What 2 forces are in balance in main sequence stars? a) electron degeneracy pressure and gravity b) gravity and gas pressure c) strong and weak force d) capitalism and socialism e) nuclear force and gravity 3) Which of the following stellar properties can you estimate simply by looking at a star on a clear night? a) distance and brightness b) brightness and luminosity c) brightness and surface temperature d) luminosity and surface temperature e) distance and surface temperature 4) A star with 10 times the mass of the Sun has a main sequence lifetime: a) about 10 times shorter than the Sun b) about 300 times shorter than the Sun c) about 10 times longer than the Sun d) about 300 times longer than the Sun e) about 10,000,000 times longer than the Sun

5) The energy source for stars is a) nuclear fission b) nuclear fusion c) electromagnetic radiation d) gravity 6) What property of a star determines its evolution? a) temperature b) mass c) color d) luminosity e) shape 7) The 2nd most abundant element in the universe is a) hydrogen b) helium c) carbon d) oxygen e) iron f) spam 8) Abe views a gas cloud from a direction in which there is no bright source behind it. Babe views the same gas cloud from a different direction, from which there is a star hotter than the gas cloud behind it. a.) Both Abe and Babe see an emission line spectrum. b.) Both Abe and Babe see an absorption line spectrum. c.) Abe sees emission lines, Babe sees absorption lines. d.) Babe sees emission lines, Abe sees absorption lines. e.) Abe sees emission lines, Babe sees a blackbody spectrum. f.) Babe sees emission lines, Abe sees a blackbody spectrum. 9) Which of the following stellar properties does NOT vary systematically along the main sequence of the Hertzspring-Russell diagram? a.) luminosity b.) temperature c.) age d.) lifetime e.) color f.) mass 10) The star Rigel in the constellation of Orion has a surface temperature which is about 3 times that of the Sun, and a diameter which is about 100 times greater than that of the Sun. Therefore its luminosity is a) 300 times greater than that of the sun b) 1200 times greater than that of the sun c) 9000 times greater than that of the sun d) 80,000 times greater than that of the sun e) 800,000 times greater than that of the sun