AST301--Sample questions for exam 4 (You already have the review sheet)

1. The pressure at the center of the sun is determined by
a. nuclear reactions.
b. the rate at which photons can diffuse through the overlying layers.
c. the fact that pressure balances the weight (due to gravity) of all the material outside the center.
d. the temperature and pressure in the photosphere.

2. How can we study the interior of the sun without using any exotic particles, just light?
a. Gamma rays from the sun's core.
b. Analyze spectral lines from the photosphere to estimate the relative abundances of different elements.
c. Interpret the complex vibrations of the sun.
d. There is no other way.

3. If we know the apparent brightness of an object, its luminosity may be calculated if we also know its
a) distance b) radial velocity c) surface temperature d) mass

4. If a star has a parallax of 0.05 seconds of arc, then its distance in parsecs is:
a) 0.05 b) 5 c) 2 d) 20 e) 200

5. The radius of a star can be estimated if the _____ and _____ of the star are known. (Assume no other information is available.)
a) parallax and spectral type b) temperature and luminosity
c) mass and temperature d) mass and luminosity

6. A certain star is observed to have a surface temperature of about 20,000K and a luminosity equal to the sun's luminosity. From this we can infer that the star is
a) more massive than the sun. b) less massive than the sun.
c) probably a young star. d) probably a white dwarf.
[Can you explain this in words?]

7. In the spectrum of a spectral type A star, you would expect to find strong lines caused by
a. neutral metals b. ionized helium c. molecules d. neutral hydrogen

8. The importance of the Hipparcos Satellite is that it allowed us to
a. obtain spectroscopic parallaxes of stars.
b. obtain stellar distances much larger than was possible previously.
c. measure the diameters of a few stars. d. determine the masses of stars.

9. What is the approximate lifetime of the most massive main sequence stars?
a) a few million years b) 100 million years
c) a few billion years d) 10 billion years e) several trillion years

10. Most spectral lines of interstellar molecules are in the _____ part of the spectrum. [WHY?]
a) ultraviolet b) visible c) infrared d) radio

11. Emission nebulae like the Orion Nebula occur only near _____ stars.
a) red supergiant b) red main sequence c) massive d) old
[Try to explain "to someone" why each of the incorrect choices are in fact incorrect.]

12. Interstellar molecules are observed mostly using radiation caused by _____.
a) electron recombination b) vibrational transitions c) rotational changes d) spin-flip transition

13. The most abundant molecule in a molecular cloud is:
a) NH_3 (ammonia) b) CO (carbon monoxide) c) H_2O (water) d) H_2 (molecular hydrogen)