ASTR 130,: Homework 5, Chapter 15, Due on Sept 19, 2016
Name: _____ Date: _____

1. If stellar parallax can be measured to a precision of about 0.01 arcsec using telescopes on Earth to observe stars, to what distance does this correspond in space?
   A) 500 pc
   B) 200 pc
   C) 100 pc
   D) 0.01 pc

2. Suppose that two identical stars (having the same total light output or luminosity) are located such that star A is at a distance of 5 pc and star B is at a distance of 25 pc. How will star B appear, compared to star A?
   A) 1/2.2 as bright
   B) 1/25 as bright
   C) 1/20 as bright
   D) 1/5 as bright

3. Luminosity is measured in
   A) watts per square meter.
   B) Joules per second.
   C) parsecs.
   D) arcseconds per year.

4. If Star A has an apparent magnitude of +5, and Star B has an apparent magnitude of +10, then
   A) Star A is twice as bright as Star B.
   B) Star B is twice as bright as Star A.
   C) Star A is 100 times as bright as Star B.
   D) Star B is 100 times as bright as Star A.

5. The statement that the apparent magnitude of a variable star has increased indicates that its
   A) surface temperature has decreased.
   B) surface temperature has increased.
   C) brightness has decreased.
   D) brightness has increased.

6. A star with an apparent magnitude of $m = +2.5$ is at 100 pc from Earth. What is its absolute magnitude, M?
   A) +7.5
   B) –2.5
   C) –7.5
   D) –47.5

7. The star Bellatrix in Orion looks bluish to the naked eye. Why is this?
   A) The spectrum of light emitted from Bellatrix peaks in the blue region of the spectrum, and in fact, almost all of its light is concentrated in the blue region of the spectrum.
   B) The spectrum of light emitted from Bellatrix peaks in the ultraviolet region of the spectrum. Within the visible part of the spectrum, there is more emission in the blue than in any other color.
   C) Bellatrix is moving toward us rapidly enough that its light is appreciably blueshifted.
   D) Bellatrix is made of blue material.

8. From which feature of light from a nearby star is the surface temperature determined most precisely?
   A) relative distribution of the continuum light in the spectrum
   B) relative strengths of emission lines in its spectrum
   C) relative strengths of absorption lines from different atoms (e.g., H, Ca) and molecules (e.g., TiO)
   D) Doppler shift of its spectral lines

9. The spectral class of the Sun is G2 and the star Enif is K2. From this information, we know that Enif is
   A) intrinsically fainter than the Sun.
   B) cooler than the Sun.
   C) intrinsically brighter than the Sun.
   D) hotter than the Sun.

10. Why is there a limited range of stellar surface temperatures around 10,000 K, at which neutral hydrogen gas absorbs visible light in the Balmer series?
    A) Electrons in hydrogen have to be at the $n = 2$ energy level to produce absorption in this series. If the gas is too cold, most atoms are in the $n = 1$ state, and if it is too hot, most atoms are ionized.
    B) There must be sufficient continuum radiation from the stellar surface in the visible region to be absorbed by the hydrogen gas.
    C) Electrons must be in the ground state $n = 1$ to undergo Balmer absorption. If the gas is too cold, electrons cannot be excited from this level, whereas if it is too hot, there are no electrons left in the $n = 1$ level.
    D) There must be electrons at the $n = 3$ energy level for Balmer absorption to occur. If the gas is too cold, electrons are only in the $n = 1$ and 2 levels, whereas if the gas is too hot, the gas is ionized, and no electrons are left in the hydrogen atoms.

11. The Hertzsprung-Russell diagram is a plot of
    A) apparent brightness vs. intrinsic brightness or luminosity of a group of stars.
    B) luminosity vs. period of variation for variable stars.
    C) apparent brightness vs. distance for stars near the Sun.
    D) intrinsic brightness or luminosity vs. temperature of a group of stars.

12. What is the physical reason that astronomers can find the luminosity class (I, II, III, IV, or V) of a star using the star's spectrum?
    A) The relative amounts of hydrogen, helium, and other elements are different for stars of different luminosity classes.
    B) The absorption lines in the spectrum are affected by the density and pressure of the star's atmosphere.
    C) The absorption lines in the spectrum are affected by the star's surface temperature.
    D) The wavelength of maximum emission (given by Wien's law) is affected by the size of the star.