

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. If a nearby star shows a parallax of 0.5 arcseconds when Earth moves through 1 AU, at what distance is it from Earth in light-years?  
A) 2 ly  
B) 6.52 ly  
C) 1.83 ly  
D) 3.26 ly
2. We are about 8000 parsecs from the center of our Milky Way galaxy, and the smallest parallax angle we can measure from orbiting observatories is about 0.001 arcseconds. How far toward the galactic center can we see with this technique (ignoring galactic dust and other obstacles)?  
A) all the way to the center  
B) about halfway to the center  
C) about an eighth of the way to the center  
D) only  $0.008 = 1/125$  of the way to the center
3. Suppose that, at night, the brightness of a light bulb is measured from a certain distance and then the light bulb is moved to a distance twice as far away. How bright will the light appear compared to the earlier measurement?  
A)  $1/16$  as bright  
B)  $1/2$  as bright  
C)  $1/8$  as bright  
D)  $1/4$  as bright
4. If Mercury is at 0.4 AU, the Moon is at 1.0 AU, and the inverse-square law holds, how much more light falls on a unit area of Mercury's surface than on an equivalent area of the Moon?  
A) 6.25 times more  
B) 0.4 times as much  
C) 2.5 times more  
D) 16 times more

5. 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.
6. A star whose absolute magnitude  $M$  is + 2.2 is seen to have an apparent magnitude when viewed from Earth of  $m = + 5.2$ . How far away is the star?
- A) 40 pc
  - B) 130 pc
  - C)  $10^3$  or 1000 pc
  - D) 4 pc
7. The ratio of the brightness of a star at two different colors, blue and visual— $b_V/b_B$ —is a direct measure of what property of the star?
- A) distance from Earth
  - B) surface temperature
  - C) luminosity
  - D) radius
8. The spectral type of a star is most directly related to (and determines uniquely) its
- A) size or radius.
  - B) absolute magnitude.
  - C) luminosity.
  - D) surface temperature.
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. Two stars are found to have the same luminosity. However, one star has twice the surface temperature of the other. From this information, what can you determine about their radii?
- A) The hotter star has half the radius of the cooler star.
  - B) The cooler star has half the radius of the hotter star.
  - C) The hotter star has a quarter the radius of the cooler star.
  - D) Nothing can be determined about the radii from this information.
11. Where on the Hertzsprung-Russell diagram do most local stars in our universe congregate?
- A) in the supergiant area, where the most massive stars spend a significant time
  - B) in the giants area, where most stars spend the longest time of their lives
  - C) in the white dwarf area, the “graveyard” of stars
  - D) on the main sequence where stars are generating energy by fusion reactions
12. How much smaller (in radius) than the Sun is a white dwarf star whose temperature is the same as that of the Sun?
- A) 100 times smaller
  - B) It will be the same size as the Sun, because it has the same temperature.
  - C) 10 times smaller
  - D) 2 times smaller
13. 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.
14. The star Spica is classified as B1 V, which means that it is a
- A) cool main sequence star.
  - B) cool giant.
  - C) hot supergiant.
  - D) hot main sequence star.

15. A particular star in a binary star system orbits the other in an elliptical orbit with a semimajor axis of 3 AU and a period of 5 years. What is the sum of the masses of the two stars in the system?
- A)  $0.9 M_{\odot}$
  - B)  $1.1 M_{\odot}$
  - C)  $13.9 M_{\odot}$
  - D)  $0.07 M_{\odot}$
16. How do two unequal mass stars move around each other in a binary system?
- A) in a common elliptical orbit, always remaining diametrically opposite to each other through one of the foci of the ellipse
  - B) in straight lines, back and forth past each other
  - C) in elliptical orbits, about a common “center of mass”
  - D) The low-mass star moves in a circular orbit around the stationary high-mass star.
17. Observations of binary stars have helped astronomers to determine which important scientific parameter?
- A) the universal gravitational constant
  - B) stellar masses
  - C) the speed of light in deep space
  - D) the sizes of stars
18. The radial-velocity curve of a star in a binary star system is a plot against time of the
- A) speed of the star in a direction perpendicular to the line of sight to the star.
  - B) temperature of the star as determined from the movement of the peak wavelength of its spectrum.
  - C) position of the star in celestial coordinates.
  - D) variation of Doppler shift of its spectral lines and hence of its speed toward or away from us.