Astronomy II (ASTR-1020) — Homework 2

Due: 10 February 2009

The answers of this multiple choice homework are to be indicated on a Scantron sheet (either Form # 822 N-E or Ref # ABF-882) which you are to buy at the bookstore. **Remember to use a No. 2 pencil on these Scantron sheets**. Don't forget to write your name and the **Homework No.** (*e.g.*, 2) on the Scantron sheet. You are to turn in this Scantron at the beginning of class on the date indicated above. There are 20 questions on this homework assignment.

Useful Constants

G	=	6.673×10^{-11} m^3/s^2/kg	g	=	9.80 m/s^2
c	=	3.00×10^5 km/s	h	=	6.626×10^{-34} J s
k	=	1.38×10^{-23} J/K	$H_\circ$	=	50 km/sec/Mpc
$M_{\rm moon}$	=	7.35×10^{22} kg	$M_\odot$	=	1.99×10^{30} kg
$M_\oplus$	=	5.98×10^{24} kg	$R_\oplus$	=	6.38×10^6 m
$R_\odot$	=	6.96×10^8 m	$T_\odot$	=	5800 K
1 AU	=	1.50×10^{11} m	$L_\odot$	=	3.90×10^{26} W
e	=	1.60×10^{-19} C	σ	=	5.67×10^{-8} W/m^2/K^4
m_e	=	9.11×10^{31} kg	m_p	=	1.67×10^{-27} kg
1 ly	=	9.46×10^{15} m	1 pc	=	3.09×10^{16} m
1 km	=	10^3 m	1 hr	=	3600 s
1 mi	=	5280 ft	1 mi	=	1.609 km
1 day	=	24 hrs	1 yr	=	365.24 days
1 Å	=	10^{-10} m	1 nm	=	10^{-9} m

1. Luminous stars can ionized the ISM which we see as a(n)

a) reflection nebula b) dark nebula c) H I region

d) H II region e) stellar nebula

2. As cloudlets shrink in size they spin faster. Which of the following results from this?

a) a spherical shell b) a rectangular slab c) a flattened disk

d) leptons e) baryons

3. Besides seeing nebula, the existence of the ISM can be seen by what in a stellar spectrum?

a) wide absorption lines b) hydrogen lines c) helium lines

d) narrow absorption lines e) resonance lines

4. A star has a $(B - V)$ color index of –0.4 and a $(U - B)$ color index of 0.2. If this star has a visual magnitude of 2.6, what is its ultraviolet magnitude?

a) –0.6 b) 0.2 c) 2.0 d) 2.4 e) 3.2

5. Why do H II regions take on a reddish appearance in photographs?

a) From emission of hydrogen's Lyman-alpha line.

b) From emission of hydrogen's Balmer-alpha line.

c) From emission of the doubly-ionized oxygen line at 5007 Å.

d) Because the temperature of the gas is such that most of its light is emitted in the red part of the spectrum.

e) Because dust in the H II region scatters out blue light emitted from the nebula.

6. Starlight gets redder as it travels through the ISM, this effect is called interstellar

a) scattering b) absorption c) reddening

d) travel e) none of these

7. What is the name of the effect that causes spectral lines to split into two components when photons pass through an intense magnetic field?

a) Doppler b) Hertzsprung c) Russell d) Zeeman e) Coriolis

8. The luminosity of a star can be deduced from what effect seen in spectral lines?

a) metalicity b) line ratios c) pressure broadening

d) radiation broadening e) Doppler effect

9. The distance to the Andromeda Galaxy can be determined by comparing the apparent brightness of an O star on the main sequence to its absolute magnitude as determined from its location on the H-R Diagram. This type of distance determination is called

a) trigonometric parallax b) moving cluster method c) parsec determination

d) spectral classification e) spectroscopic parallax

10. Which of these stellar properties <u>cannot</u> be deduced from stellar spectra?

a) luminosity b) chemical composition c) temperature

d) mass e) magnetic field strength

11. Plotting the apparent magnitude of stars versus their colors produces what type of diagram?

a) Hubble tuning fork b) observational H-R c) theoretical H-R

d) stellar evolution e) stellar distance

12. What did Annie Jump Cannon do that was important to astronomy?

a) She invented the refracting telescope.

b) She invented the reflecting telescope.

c) She invented the stellar luminosity classification scheme.

d) She invented the stellar spectral classification scheme.

e) She jumped out of airplanes to demonstrate hydrostatic equilibrium.

13. Which of the following is <u>not</u> a stellar luminosity class?

a) bright giant b) giant c) faint giant d) supergiant e) dwarf

14. The brightness of a star at a distance of 10 parsecs is called

a) luminosity b) total flux c) apparent magnitude

d) absolute magnitude e) none of these

15. A star has a measured parallax of 0.01 arcsecs, how far away is it?

a) 0.01 parsecs b) 0.01 light years c) 1 parsec

d) 10 parsec e) none of these

16. As cloudlets shrink in size they spin faster due to the conservation of

a) angular momentum b) linear momentum c) energy

d) hydrostatic equilibrium e) baryons

17. We determine to the distances to the nearby star clusters with what method?

a) trigonometric parallax b) moving cluster method c) spectroscopic parallax

d) radar e) sonar

18. If a binary star system has an orbital plane that is in the *line-of-sight*, what type of binary system is this?

a) spectroscopic b) visual c) eclipsing d) ultraviolet e) infrared

19. Which of the following <u>cannot</u> be used to determine stellar temperature?

a) Measure the wavelength of the peak emission of light coming from the star.

b) Measure the total flux emitted from the star.

c) Measure the ratio of abundances of ions with respect to neutrals of an atomic species in the gas.

d) Measure spectral line shifts due to the Doppler effect.

e) Determine the color index of a star.

20. Why can't H III exist?

a) Neutral hydrogen, at most, has only two electrons.

b) Neutral hydrogen, at most, has only one electron.

c) Neutral hydrogen, at most, has only two neutrons.

d) Neutral hydrogen, at most, has only one neutron.

e) H III <u>can</u> exist in nature!