ASTR 135 Exam 3 – 4/3/2015

Reordered by topic

1) An observer is located in Darwin, Australia at 12˚ south latitude. Can the observer see the north celestial pole?
   a) Yes
   b) No
   c) Sometimes
2) The same Australian observer plants a vertical pole and watches the shadow cast by the sun over the course of a year. When does the pole cast no shadow at noon?
   a) Never. It always casts a shadow.
   b) Twice yearly, on the equinoxes
   c) Twice yearly, between the equinoxes and the Dec 21 solstice
   d) Twice yearly, between the equinoxes and the June 21 solstice
   e) Once yearly, near June 21
3) At sunrise, you look toward the south and high in the sky. You see the moon. What phase is the moon in?
   a) new
   b) first quarter
   c) full
   d) last quarter
4) At sunset, you look toward the east. The moon is right on the horizon. What phase is the moon in?
   a) new
   b) first quarter
   c) full
   d) last quarter
5) You wish to photograph a first quarter moon. It says “first quarter moon” for today on the calendar. You need to set up your camera
   a) at noon, pointing toward the south, high up
   b) at sunset, pointing toward the south, high up
   c) at midnight, pointing toward the south, high up
   d) at sunrise, pointing toward the south, high up
6) I really really enjoyed seeing the full moon! How long do I have to wait to see another?
   a) A day
   b) 12 days
   c) 14 days
   d) 29 days
   e) 365 days
7) Lunar eclipses (moon goes red) occur during lunar phase
   a) new
   b) first quarter
   c) full
   d) last quarter
8) A solar day is when the earth rotates 360 degrees
   a) with respect to the sun. It is 24 hours long.

b) with respect to the sun. It is more than 24 hours long.
c) with respect to the stars. It is less than 24 hours long.
d) with respect to the stars. It is more than 24 hours long.

9) A sidereal day is when the earth rotates 360 degrees
a) with respect to the sun. It is less than 24 hours long.
b) with respect to the sun. It is 24 hours long.
c) with respect to the stars. It is less than 24 hours long.
d) with respect to the stars. It is more than 24 hours long.

10) The celestial coordinate *right ascension* is measured
a) west from the summer solstice
b) west from the autumnal equinox
c) east from the winter solstice
d) east from the vernal equinox

11) The sun is at (R.A., dec.) = (12 h, 0 degrees).
a) That happens around June 21 and is called the summer solstice.
b) That happens around March 21 and is called the summer solstice.
c) That happens around September 21 and is called the autumnal equinox.
d) That happens around December 21 and is called the winter solstice.
e) Trick! The sun will never be at those coordinates.

12) The sun is at (R.A., dec.) = (12 h, -23.5 degrees).
a) That happens around June 21 and is called the summer solstice.
b) That happens around March 21 and is called the summer solstice.
c) That happens around September 21 and is called the autumnal equinox.
d) That happens around December 21 and is called the winter solstice.
e) Trick! The sun will never be at those coordinates.

13) The sun is at (R.A., dec.) = (18 h, -23.5 degrees).
a) That happens around June 21 and is called the summer solstice.
b) That happens around March 21 and is called the vernal equinox.
c) That happens around September 21 and is called the autumnal equinox.
d) That happens around December 21 and is called the winter solstice.
e) Trick! The sun will never be at those coordinates.

14) An observer in Arizona at 35 degrees north latitude looks at the north celestial pole location in the sky. That is, they look
a) South, 35 degrees up from the horizon (az., alt.) = (180, 35)
b) South, 90 – 35 = 55 degrees up from the horizon (az., alt.) = (180, 55)
c) North, 35 degrees up from the horizon (az., alt.) = (0, 35)
d) North, 90 – 35 = 55 degrees up from the horizon (az., alt.) = (0, 55)

15) The sun rises due east
a) twice a year, on the solstices
b) twice a year, on the equinoxes
c) never
d) always
e) once a year, on the summer solstice

16) On September 21, a careful observer notes the exact compass point on the horizon where the sun rises. A few days later, the sun rises
a) further north
b) at the same place
c) further south

17) On May 25, a careful observer notes the exact point on the horizon where the star Sirius rises. On May 30, Sirius rises _____ . (Ignore effects of precession, please.)
   a) further north
   b) at the same place
   c) further south
18) Other things being equal, an astronomer would prefer an instrument with a
   a) small resolution angle
   b) large resolution angle
19) Which wavelength regime contains potentially ionizing (electron-stripping) photons?
   a) Microwave
   b) Infrared
   c) Visible
   d) X-ray
   e) Radio
20) Which wavelength regime penetrates earth's atmosphere and finds it perfectly transparent?
   a) Microwave
   b) Infrared
   c) X-rays
   d) Ultraviolet
   e) Radio
21) What's faster?
   a) a laser beam
   b) radio waves
   c) same speed for both
22) An object coming toward you exhibits a
   a) redshift
   b) blueshift
23) Suppose you have two stars tugging on each other with a force of 10^{38} Newtons of force. Now you double the distance between them. What is the new force?
   a) $\frac{1}{4} \times 10^{38}$
   b) $\frac{1}{2} \times 10^{38}$
   c) 2×10^{38}
   d) 4×10^{38}
24) A planet moves faster along its orbit
   a) when near the sun
   b) when far from the sun
   c) at all places along its orbit
25) The star Alpha Centauri has a spectrum that looks almost exactly like the sun's. If it is indeed a twin of the sun, why is it about a hundred billion times fainter in terms of luminous flux?
   a) It must be small
   b) It must be distant
   c) It must be cool
   d) It must be located behind an absorbing cloud of dusty gas
26) The best place for an X-ray telescope is
   a) in a deep cave
   b) in the ocean
   c) on a high mountaintop
   d) in space
27) The earth's atmosphere is transparent to

a) infrared
b) visible
c) X rays
d) ultraviolet
e) gamma rays

28) Which of the following is not light (not electromagnetic radiation)
a) gamma rays
b) X rays
c) beta rays
d) ultraviolet

29) A blue light photon _____ a red light photon
a) is less energetic than
b) is more energetic than
c) has the same amount of energy as

30) A blue light photon _____ a red light photon.
a) is slower than
b) is faster than
c) has the same speed as

SMALL BODIES

31) What objects are icy and typically reside in the Oort cloud?
a) meteors
b) asteroids
c) comets
d) moons

32) What is the composition of a typical asteroid?
a) ice and rock
b) rock and metal
c) gas

33) Of falls on earth, what is the most common meteorite type?
a) Iron
b) stony-iron
c) stone
d) carbonaceous chondrite

34) Pluto resides in
a) the asteroid belt
b) the Kuiper belt
c) the Oort cloud
d) the solar nebula

35) The earth has impact craters
a) true
b) false

36) Worry most about impacts from
a) head-sized meteors
b) house-sized meteors
c) several-kilometer meteors

STARS

37) Blue stars are _____ than red ones.
   a) hotter
   b) cooler
38) After the fusion of hydrogen (in the core of the sun) what is left over?
   a) neutrons
   b) helium
   c) electrons
   d) energy
39) The thickest layer of the sun's atmosphere is the _____.
   a) Photosphere
   b) Chromosphere
   c) Corona
40) The hottest of the sun's outer layers is the _____ .
   a) Photosphere
   b) Chromosphere
   c) Corona
41) Most of the sun's light that we see comes from the _____ .
   a) Photosphere
   b) Chromosphere
   c) Corona
42) Nearby stars, and probably all stars, are composed mostly of
   a) carbon
   b) methane
   c) helium
   d) hydrogen
43) If there were astronomers on Neptune (8th planet out from the sun), their parallax measurements for distant stars (given the same equipment as us) would be
   a) more accurate
   b) less accurate
   c) the same accuracy
44) Two star's blackbody peak wavelengths are estimated. Star A peaks at 300 nm and star B peaks at 600 nm.
   a) the surface of star A is half the temperature of the surface of star B
   b) the surface of star A is the same temperature as the surface of star B
   c) the surface of star A is twice the temperature of the surface of star B
   d) the surface of star A is hotter than the surface of star B, but by greater than a factor of 2
45) Does a 1 solar mass star ever fuse carbon (to make Ne, Mg, Na, and O) at any time in its life?
   a) yes
   b) no
46) The element iron in our bodies came from
   a) the Big Bang
   b) fusion in stars like the sun
   c) fusion in massive stars
   d) gas and dust in the Milky Way
47) A _____ develops an iron core.
   a) 1 M_{sun} star

b) 3 M_{sun} star
c) 35 M_{sun} star
d) brown dwarf
e) neutron star

48) Solitary black holes
a) emit X rays
b) emit radio waves
c) do not emit light

49) A star orbits a 6 M_{sun} black hole at a distance of several AUs. The star will
a) be sucked into the black hole
b) remain in stable orbit
c) be ejected from the system

50) Which could *not* be plotted on the ***x*** axis of any version of the H-R diagram?
a) color
b) spectral type
c) magnitude
d) temperature

51) Which could *not* be plotted on the ***y*** axis of any version of the H-R diagram?
a) absolute magnitude
b) luminosity
c) radius

52) The dead remnant left over after the life of a 1 M_{sun} star is
a) a black hole
b) a neutron star
c) a white dwarf
d) a brown dwarf

53) Nearness to a black hole does interesting things to an astronaut. Which does it not do?
a) causes the astronaut's clock to run slow according to people far away
b) causes the astronaut to appear redder in color according to people far away
c) causes the astronaut to become flatter according to people far away
d) causes the astronaut to feel heavier to himself or herself

54) The best way to measure the age of a star cluster is to chart the luminosity and color of the
a) giants
b) supergiants
c) main sequence
d) white dwarfs