

ASTR 135 Exam 2 – 3/6/2015

Topically rearranged version.

- 1) On February 1, 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
- 2) On May 25, a careful observer notes the exact point on the horizon where the star Antares rises. On May 30, Antares rises _____. (Ignore effects of precession, please.)
 - a) further north
 - b) **at the same place**
 - c) further south
- 3) An observer is located in Panama, at 15° north latitude. Can the observer see the north celestial pole?
 - a) **Yes**
 - b) No
 - c) Sometimes
- 4) The same Panamanian 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
- 5) 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)
- 6) 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
- 7) The longest-period periodic motion of the earth we have so far talked about is the 26,000 year
 - a) revolution
 - b) rotation
 - c) **precession**
 - d) obliquity
 - e) dynamical instability

- 8) At sunset, 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
- 9) 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
- 10) You wish to photograph a third quarter moon. It says "third 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**
- 11) 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
- 12) 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.
- 13) 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.
- 14) 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**
- 15) The sun is at (R.A., dec.) = (6 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 solstice.
 - d) That happens around December 21 and is called the winter solstice.
 - e) Trick! The sun will never be at those coordinates.

- 16) The sun is at (R.A., dec.) = (6 h, -23.5 degrees).
- That happens around June 21 and is called the summer solstice.
 - That happens around March 21 and is called the summer solstice.
 - That happens around September 21 and is called the autumnal solstice.
 - That happens around December 21 and is called the winter solstice.
 - Trick! The sun will never be at those coordinates.**
- 17) The sun is at (R.A., dec.) = (12 h, 0 degrees).
- That happens around June 21 and is called the summer solstice.
 - That happens around March 21 and is called the vernal equinox.
 - That happens around September 21 and is called the autumnal equinox.**
 - That happens around December 21 and is called the winter solstice.
 - Trick! The sun will never be at those coordinates.
- 18) Other things being equal, an astronomer would prefer an instrument with a
- Small resolution angle**
 - Large resolution angle
- 19) Which wavelength regime contains potentially ionizing (electron-stripping) photons?
- Microwave
 - Infrared
 - Visible
 - Ultraviolet**
 - Radio
- 20) Which wavelength regime penetrates earth's atmosphere and finds it perfectly transparent?
- Microwave
 - Infrared
 - X-rays
 - Ultraviolet
 - Radio**
- 21) The earth's atmosphere is transparent to
- infrared
 - visible**
 - X rays
 - ultraviolet
 - gamma rays
- 22) The red supergiant star Betelgeuse, at surface temperature 2900 Kelvin, is substantially cooler than the sun. In what wavelength region does it emit most of its light?
- visible
 - ultraviolet
 - infrared**
 - microwave
- 23) What's faster?
- a laser beam
 - radio waves
 - same speed for both**
- 24) KJEM FM radio broadcasts at 88.9 MHz (megahertz) and has a wavelength of about 3.4 meters. Reasoning from a formula you know, the wavelength characteristic of 105 MHz is
- 105 meters
 - 2.9 meters**
 - 3.4 meters
 - 3.9 meters

- 25) Newton extended Kepler's 3rd law to be applicable to orbiting bodies of all masses.
- a) **True**
 - b) False
- 26) Suppose you have two planets tugging on each other with a force of 10^{28} Newtons of force. Now you double the distance between them. What is the new force?
- a) $\frac{1}{4} \times 10^{28}$
 - b) $\frac{1}{2} \times 10^{28}$
 - c) 2×10^{28}
 - d) 4×10^{28}
- 27) Keeping Kepler's first law firmly in mind, what is at the center of the orbit of Halley's comet? Halley's comet has an orbital eccentricity of 0.967. Pluto's is 0.249.
- a) the sun
 - b) the earth
 - c) **no object**
 - d) the moon
- 28) Which of the following did Newton not predict or describe?
- a) elliptical orbits for planets
 - b) **line spectra for elements**
 - c) the physics of motion
 - d) the force of gravity between planets
- 29) Which is not a major category of optical telescope?
- a) **condensing**
 - b) refracting
 - c) reflecting
- 30) 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**
- 31) Which of the following is not light (not electromagnetic radiation)
- a) gamma rays
 - b) X rays
 - c) **cosmic rays**
 - d) radio waves
- 32) 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
- 33) Which nebula is not associated with star formation?
- a) Dark Cloud
 - b) Reflection nebula
 - c) H II region
 - d) **Planetary Nebula**

- 34) What nebula is the coolest and densest and might be the site of very early star formation?
- a) **Dark Cloud**
 - b) Reflection nebula
 - c) H II region
 - d) Planetary Nebula
- 35) The stronger of the two sorts of tides we experience on earth is
- a) **Spring Tide**
 - b) Neap Tide
 - c) Crimson Tide
- 36) A neap tide happens at lunar phase
- a) new
 - b) waxing crescent
 - c) full
 - d) waxing gibbous
 - e) **third quarter**
- 37) A spring tide happens at lunar phase
- a) **new**
 - b) waxing crescent
 - c) first quarter
 - d) waxing gibbous
 - e) third quarter
- 38) We think the “frost line” during the times when the solar system was forming was
- a) inside Mercury's orbit
 - b) **between Mars's and Jupiter's orbits**
 - c) around Pluto's orbit
 - d) anywhere on earth over 10,000 feet of altitude
- 39) The order of assembly of units as the solar system formed is (“small debris” means few-kg objects of rocky or icy composition)
- a) planetesimals – small debris – dust grains – protoplanets.
 - b) **molecules – dust grains – small debris – planetesimals – protoplanets.**
 - c) small debris – dust grains – molecules – planetesimals – protoplanets.
 - d) planetesimals – molecules – small debris – dust grains – protoplanets.
- 40) Gas giants are mostly
- a) solid rock
 - b) liquid water
 - c) **gas**
 - d) plasma
- 41) A “geologically old” surface is characterized by
- a) divergent and convergent plate boundaries
 - b) volcanos
 - c) granite and basalt rock types
 - d) **impact craters**
- 42) Io has a geologically young surface characterized by
- a) divergent and convergent plate boundaries
 - b) **volcanos**
 - c) granite and basalt rock types
 - d) impact craters

- 43) In addition to the law of gravity, which additional physical law means that flat, spinning gas clouds, and therefore flat, orderly planetary systems, must be common and almost inevitable?
- a) conservation of energy
 - b) conservation of mass
 - c) conservation of angular momentum**
 - d) conservation of time
- 44) Most of the mass in the solar system is contained in
- a) the planets
 - b) the sun**
 - c) small bodies in the solar system
- 45) Most of the angular momentum in the solar system is contained in
- a) the planets**
 - b) the sun
 - c) small bodies in the solar system
- 46) The solar system is about
- a) 6000 years old
 - b) 66 million years old
 - c) 4.55 billion years old**
 - d) 14 billion years old
 - e) 3.3 trillion years old
- 47) Saturn's rings are somewhat of a mystery, but they most likely were made by
- a) a very volcanic moon that ejected material into its orbital path
 - b) a "spin up" event on Saturn that caused it to throw off material
 - c) the capture of millions of small asteroids
 - d) a moon that got too close and disintegrated due to tidal forces**
- 48) An object coming toward you exhibits a
- a) redshift
 - b) blueshift**
- 49) _____ is most properly called an *ice giant* due to more water in its overall composition.
- a) Saturn
 - b) Titan
 - c) Uranus**
 - d) Jupiter
- 50) If my list of evidence for tectonism observed on a planet includes rift zones, volcanoes, pancake volcanoes, lava channels, mountains, and coronae, the world I am observing is
- a) Earth
 - b) Mars
 - c) Venus**
 - d) Io
 - e) Mercury