AST 1210 - Introduction to the Sky and Solar System
FALL 2009 - EXAM 1
TEST VERSION 0
ANSWERS

INSTRUCTION: You have until the end of class to finish the exam. You may NOT consult notes, books, computers, calculators, cellphones or other people. Please write out and sign the **honor pledge** in the space provided at the end of the exam.

Multiple Choice. *In the blanks provided before each question write the letter for the phrase that best answers the question or completes the thought and fill in the corresponding area on the computer graded sheets with a number 2 lead pencil.*

A 1. Why does the Moon appear red when it is close to the horizon?

A. Bluer wavelengths of light are more easily scattered by the atmosphere than redder wavelengths of light
B. The Moon only emits red light.
C. The reason is unknown
D. Tidal interactions between the Earth and Moon redden the light emitted from the Moon.
E. Light from the Moon is redshifted when the Moon is close to the horizon

D 2. Which of the following techniques can be used to determine the composition of astronomical objects

A. telemetry
B. bolometry
C. microscopy
D. spectroscopy
E. barometry

E 3. Suppose that on a given evening you notice that the sunlit portion of the Moon has a crescent shape. This simple observation tells you

A. nothing at all about where the Moon is in space compared to you and the Sun
B. that the Moon and Earth are of equal distance from the Sun
C. that at that particular time the Moon is further from the Sun than you are
D. that the line from you to the Moon is exactly at right angles to the line from you to the Sun
E. that at that particular time the Moon is closer to the Sun than you are

D 4. Which of these is NOT a property of a photon

A. has a specific wavelength
B. massless
C. can be absorbed by an electron
D. travels at twice the speed of light
E. has an energy which is dependent on its frequency

C 5. When the Sun is at one of its equinoxes,

A. the day is longer than the night for one hemisphere of the Earth and shorter in the other hemisphere
B. day and night are or equal length only for people on the equator
C. day and night are equal everywhere on the Earth
D. people on the equator have perpetual daylight
E. people on the equator have perpetual night

B 6. The other side of the Moon is never visible from the Earth. What does this tell us about the moon's rotation?

A. The rotation period of the Moon is greater than its orbital period around the Earth
B. The rotation period of the Moon is equal to its orbital period around the Earth
C. The rotation period of the Moon is less than its orbital period around the Earth
D. The Moon does not rotate
E. The Earth does not rotate

C 7. Planets farther than one astronomical unit from the sun travel

A. faster than the Earth
B. in hyperbolic orbits
C. slower than the Earth
D. in epicycles
E. at the same speed as the Earth

B 8. A wavelength is

A. the number of peaks or troughs of a wave that pass a given point per second
B. the distance between successive peaks or troughs of a wave
C. the amplitude times the frequency of a wave
D. the height between each crest and trough of a wave
E. none of the above

E 9. A scientist observes a new phenomenon which disagrees with their explanation or hypothesis. In keeping with the scientific method, they should

A. Discard the observations as erroneous
B. modify the observational data to agree with the hypothesis
C. wait until someone else develops an adequate explanation before announcing their observation.
D. continue to make observations with the hope that eventually the observations will agree with their theory
E. modify their hypothesis

D 10. Summertime in the northern hemisphere occurs when

A. the Earth is closest to the Sun in its elliptical orbit
B. the moon cannot eclipse the sun
C. the Earth is farthest from the ecliptic plane
D. sunlight falls more directly upon this hemisphere, heating it more than average
E. the clearest skies occur, because of climate

E 11. Which of these is a discovery made by Galileo

A. the geocentric model of the solar system
B. comets
C. the law of gravity
D. the planet Pluto
E. sunspots

D 12. Stellar parallax is

A. the apparent backward motion of the outer planets as the Earth overtakes them in their orbit
B. the circular or elliptical motion of a star in a binary system, as the two stars orbit around each other
C. the apparent change in the distances to a star if its light is dimmed by passing through interstellar clouds
D. the apparent shift that we see in the position of a nearby star as we orbit the Sun
E. the difference between the apparent brightness and absolute brightness of a star

A 13. June 21, a time when the Sun is highest in the sky, is known as

A. Summer Solstice
B. Winter Solstice
C. Vernal Equinox
D. Meridian
E. Spring Equinox

B 14. The phase of the Moon at the time of lunar eclipse

A. is third quarter
B. is full
C. is first quarter
D. is new
E. can be any phase

A 15. 1 astronomical unit, or 1 AU is defined as

A. the mean distance between the Sun and the Earth
B. the size of the solar system
C. the distance from which the Earth-Sun distance will subtend an angle of 1 arcsecond
D. the distance traveled by light in 1 second
E. the distance traveled by light in 1 year

E 16. The pattern of stars visible from one spot on the Earth gradually shifts from east to west during one night. This is caused primarily by

A. the wind
B. the motion of the Earth around the Sun
C. the rotation of our Galaxy
D. the motion of the Moon in its orbit around the Earth
E. the rotation of the Earth about its own axis

B 17. Two massive bodies, initially at rest in space, will

A. orbit one another in circles
B. move toward one another
C. move in elliptical orbits around one another
D. move away from each other with constant acceleration
E. move in hyperbolic orbits around one another

B 18. If an ice skater pulls in his/her arms while spinning in place,

A. he/she will spin slower as a result of conservation of rotational angular momentum
B. he/she will spin faster as a result of conservation of rotational angular momentum
C. he/she will spin as the same speed a result of conservation of rotational angular momentum
D. he/she will fall as a result of tidal interactions with the ground
E. none of the above

E 19. An atom which has had one or more electrons removed is known as

A. a molecule
B. an isotope
C. a compound
D. an excited atom
E. an ion

B 20. The heliocentric system

A. describes the phases of the moon
B. is a Sun-centered model of the solar system
C. is an Earth-centered model of the solar system
D. is a black hole-model of the solar system
E. describes the manner in which the planets are heated by sunlight

C 21. According to Newton's Law of Gravity, as the distance between two objects with mass increases, the force of gravity between those two objects

A. impossible to tell
B. stays the same
C. decreases
D. gravity does not affect objects with mass
E. increases

B 22. You are standing on a weight scale in an elevator which is not moving. You measure your weight on the scale - it reads 140 lbs. The elevator then begins to free fall, and you check your measured weight again. The measured value on the scale is now

A. 70 lbs
B. 0 lbs
C. 140 lbs
D. 280 lbs
E. 9.8 lbs

A 23. How did Ptolemy explain retrograde motion in his model of the universe?

A. He believed it was caused by epicycles
B. He believed it was caused by planetary inertia
C. He believed it was caused by the Earth's rotation
D. He believed it was caused by the faster rotation of the Earth compared to other planets
E. He believed it was caused by gravity

C 24. At what point in its orbit is a planet farthest from the Sun?

A. quadrature
B. retrograde
C. aphelion
D. perihelion
E. parallax

D 25. The definition of an ellipse states that

A. the distances between any point on the curve and two fixed points always maintain the same ratio to one another
B. the difference in distances between any point on the curve and two fixed points remain constant
C. the distance from any point on the curve to a single fixed point is constant
D. the sum of the distances from any point on the curve to two fixed points remains constant
E. the difference in distances between any point on the curve and a fixed point remain constant

D 26. Which moon rises as the sun sets?

A. First quarter moon.
B. Third quarter moon.
C. New moon.
D. Full moon.
E. Half moon.

D 27. How were early astronomers able to conclude that the Earth was round without ever seeing the planet from space

A. Ships sailing out to sea disappear from the bottom up
B. The altitude of constellations changes as one moves North-South
C. The edge of the Earth's shadow on the Moon is always part of a circular arc
D. All of the above
E. A) and C) only

E 28. In modern astronomy, the constellations are

A. a small number of well-defined groups of stars, each of limited extent, in our sky
B. names of astronomers who have made substantial contributions to science
C. 12 specific regions in our sky, through which the planets and Moon appear to move
D. nearby comets, carefully labeled for the convenience of astronomers
E. 88 sky regions which cover the whole sky

A 29. Kepler's law states that a planet moves around the Sun

A. in an elliptical orbit, with the Sun at one focus
B. in a circle, with the Sun at the center
C. in an elliptical orbit, with the Sun at the center of the ellipse
D. in a parabolic orbit
E. in a hyperbolic orbit, with the Sun at the center

A 30. Which of the following planets exhibits phases to an observer on Earth?

A. Venus
B. Mars
C. Uranus
D. Saturn
E. Pluto

A 31. Edwin Hubble discovered

A. that distant galaxies appear to be moving away from us
B. the motion of four moons around Jupiter
C. that the orbits of electrons around their nuclei are quantized
D. the three laws of planetary motion
E. none of the above

D 32. The nuclei of atoms can be composed of

A. neutrons only
B. ions and isotopes
C. electrons and protons
D. protons and neutrons
E. electrons only

C 33. If the Earth's rotational axis were to be perpendicular to the Earth's orbital plane (the ecliptic plane), the seasons and seasonal variation

A. would remain the same as they are at present
B. would become much more severe
C. would be nonexistent
D. would remain the same in severity as they are at present but each season would last half as long
E. would remain the same in severity as they are at present but each season would last twice as long

C 34. Kepler as a young man became the assistant to

A. Ptolemy
B. Galileo Galilei
C. Tycho Brahe
D. Copernicus
E. Isaac Newton

A 35. The apparent westward motion of a planet with respect to the stars caused by the motion of the earth is called

A. retrograde motion
B. parallatic motion
C. elliptical motion
D. copernican motion
E. sinusoidal motion

D 36. When an object appears directly above an observer, the object is said to be at its:

A. prograde
B. fugacity
C. waning
D. zenith
E. retrograde

E 37. Who discovered that the cube of the distance from the Sun divided by the square of the time required to traverse the orbit is a constant, the same for every planet?

A. Tycho Brahe
B. Isaac Newton
C. Galileo Galilei
D. John Casteen III
E. Johannes Kepler

E 38. Light can be best described as

A. wave
B. mass
C. particle
D. all of the above
E. A) and C)

D 39. The apparent path of the Sun across our sky, day by day throughout the year, is known as

A. the solstice
B. a great circle
C. the zenith
D. the ecliptic
E. the celestial equator

B 40. The scientific method is a major force in science, and has been developed to ensure that

A. our theories of the world are so precise that we never have to test them against experiment or observation
B. our theories of the world agree with what we find in experiments and observations
C. our theories of the world agree with the wisdom of the ancients
D. all experiments and observations can be modified to agree with carefully constructed theoretical ideas
E. none of the above