

Review for Astronomy 2 Midterm and Final

Midterm covers first 70 questions, Final covers all 105.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Which of the following has your "address" in the correct order?
 - A) you, Earth, solar system, Milky Way, Local Supercluster, Local Group
 - B) you, Earth, Local Group, Local Supercluster, solar system, Milky Way
 - C) you, Earth, solar system, Milky Way, Local Group, Local Supercluster
 - D) you, Earth, solar system, Local Group, Local Supercluster, Milky Way
 - E) you, Earth, solar system, Local Group, Milky Way, Local Supercluster

- 2) Which of the following statements about the celestial sphere is *not* true?
 - A) When we look in the sky, the stars all appear to be located on the celestial sphere.
 - B) The celestial sphere does not exist physically.
 - C) Earth is placed at the center of the celestial sphere.
 - D) From any location on Earth, we can see only half the celestial sphere at any one time.
 - E) The "celestial sphere" is just another name for our universe.

- 3) Which of the following statements about the celestial equator is true at *all* latitudes?
 - A) It lies along the band of light we call the Milky Way.
 - B) It extends from your horizon due east, through your zenith, to your horizon due west
 - C) It represents an extension of Earth's equator onto the celestial sphere.
 - D) It extends from your horizon due north, through your zenith, to your horizon due south
 - E) It cuts the dome of your sky exactly in half.

- 4) What is the *ecliptic*?
 - A) the constellations commonly used in astrology to predict the future
 - B) the Sun's daily path across the sky
 - C) the Sun's apparent path along the celestial sphere
 - D) when the Moon passes in front of the Sun
 - E) the Moon's apparent path along the celestial sphere

- 5) Which scientists played a major role in overturning the ancient idea of an Earth-centered universe, and about when?
 - A) Aristotle and Copernicus; about 400 years ago
 - B) Copernicus, Kepler, and Galileo; about 400 years ago
 - C) Aristotle and Plato; about 2,000 years ago
 - D) Huygens and Newton; about 300 years ago
 - E) Newton and Einstein; about 100 years ago

- 6) Which of the following correctly describes the *meridian* in your sky?
 - A) the boundary between the portion of the celestial sphere you can see at any moment and the portion that you cannot see
 - B) a half-circle extending from your horizon due east, through your zenith, to your horizon due west
 - C) a half-circle extending from your horizon due east, through the north celestial pole, to your horizon due west
 - D) the point directly over your head
 - E) a half-circle extending from your horizon due north, through your zenith, to your horizon due south

- 7) How many arcseconds are in 1° ?
- A) 360
 - B) 60
 - C) 3,600
 - D) 100
 - E) 10,000
- 8) What is a *circumpolar* star?
- A) a star that is visible from the Arctic or Antarctic circles
 - B) a star that is close to the south celestial pole
 - C) a star that always remains above your horizon
 - D) a star that makes a daily circle around the celestial sphere
 - E) a star that is close to the north celestial pole
- 9) Which of the following is *not* a phase of the Moon?
- A) full Moon
 - B) first-quarter Moon
 - C) new Moon
 - D) half Moon
 - E) third-quarter Moon
- 10) If the Moon is setting at 6 A.M., the phase of the Moon must be
- A) full.
 - B) third quarter.
 - C) first quarter.
 - D) waning crescent.
 - E) new.
- 11) Which of the following never goes in retrograde motion?
- A) Jupiter
 - B) the Sun
 - C) Venus
 - D) Mars
 - E) Saturn
- 12) Roughly how many stars are in the Milky Way Galaxy?
- A) 1 billion
 - B) 100 billion
 - C) 100 million
 - D) 100 trillion
 - E) 10 billion
- 13) What is an *astronomical unit*?
- A) the average distance from Earth to the Sun
 - B) any basic unit used in astronomy
 - C) the length of time it takes Earth to revolve around the Sun
 - D) the diameter of Earth's orbit around the Sun
 - E) the average speed of Earth around the Sun
- 14) How did Eratosthenes estimate the size of Earth in 240 B.C.?
- A) by observing the duration of a solar eclipse
 - B) by measuring the size of Earth's shadow on the Moon in a lunar eclipse
 - C) by sending fleets of ships around Earth
 - D) by comparing the maximum altitude of the Sun in two cities at different latitudes
 - E) We don't know how he did it since all his writings were destroyed.

- 15) Why did Ptolemy have the planets orbiting Earth on "circles upon circles" in his model of the universe?
- A) to explain why Venus goes through phases as seen from Earth
 - B) to explain why more distant planets take longer to make a circuit through the constellations of the zodiac
 - C) to explain why the Greeks were unable to detect stellar parallax
 - D) to explain the fact that planets sometimes appear to move westward, rather than eastward, relative to the stars in our sky
 - E) to properly account for the varying distances of the planets from Earth
- 16) Where was the Sun in Ptolemy's model of the universe?
- A) between Earth and the Moon's orbit
 - B) at the center
 - C) between the orbits of Venus and Mars
 - D) at the outer edge, beyond Saturn's orbit
 - E) slightly offset from the center
- 17) The controversial book of this famous person, published in 1543 (the year of his death), suggested that Earth and other planets orbit the Sun.
- A) Ptolemy
 - B) Galileo
 - C) Copernicus
 - D) Kepler
 - E) Tycho Brahe
- 18) He discovered that the orbits of planets are ellipses.
- A) Galileo
 - B) Tycho Brahe
 - C) Copernicus
 - D) Kepler
 - E) Ptolemy
- 19) He discovered that Jupiter has moons.
- A) Ptolemy
 - B) Aristotle
 - C) Tycho Brahe
 - D) Galileo
 - E) Kepler
- 20) From Kepler's third law, an asteroid with an orbital period of 8 years lies at an average distance from the Sun equal to
- A) 4 astronomical units.
 - B) 8 astronomical units.
 - C) 16 astronomical units.
 - D) 2 astronomical units.
 - E) It depends on the asteroid's mass.
- 21) What is meant by a *hypothesis*?
- A) a natural phenomenon that requires explanation
 - B) an explanation for a phenomenon that makes a prediction
 - C) a historical theory that has been proved inaccurate
 - D) a tentative understanding of a natural phenomenon
 - E) a pseudoscientific idea
- 22) If your mass is 60 kg on Earth, what would your mass be on the Moon?
- A) 10 lb
 - B) 60 lb
 - C) 50 kg
 - D) 60 kg
 - E) 10 kg
- 23) What would happen if the Space Shuttle were launched with a speed greater than Earth's *escape velocity*?
- A) It would travel away from Earth into the solar system.
 - B) It would be in an unstable orbit.
 - C) It would travel in a higher orbit around Earth.
 - D) It would take less time to reach its bound orbit.
 - E) It would orbit Earth at a faster velocity.

- 24) The movement of a pool ball, after being struck by a cue, is an example of
- A) Newton's third law of motion.
 - B) conservation of momentum.
 - C) the universal law of gravitation.
 - D) Newton's second law of motion.
 - E) Newton's first law of motion.
- 25) The force of gravity is an inverse square law. This means that, if you double the distance between two large masses, the gravitational force between them
- A) weakens by a factor of 2.
 - B) strengthens by a factor of 4.
 - C) also doubles.
 - D) is unaffected.
 - E) weakens by a factor of 4.
- 26) According to the *universal law of gravitation*, if you double the masses of *both* attracting objects, then the gravitational force between them will
- A) not change at all.
 - B) increase by a factor of 2.
 - C) increase by a factor of 4.
 - D) decrease by a factor of 2.
 - E) decrease by a factor of 4.
- 27) The mass of Jupiter can be calculated by
- A) measuring the orbital speed of one of Jupiter's moons.
 - B) knowing the Sun's mass and measuring how Jupiter's speed changes during its elliptical orbit around the Sun.
 - C) measuring the orbital period and distance of one of Jupiter's moons.
 - D) knowing the Sun's mass and measuring the average distance of Jupiter from the Sun.
 - E) measuring the orbital period and distance of Jupiter's orbit around the Sun.
- 28) At which lunar phase(s) are tides most pronounced (e.g., the highest high tides)?
- A) first quarter
 - B) full Moon
 - C) new Moon
 - D) both new and full Moons
 - E) both first and third quarters
- 29) An atom in an *excited state* contains more of what type of energy than the same atom in the *ground state*?
- A) gravitational potential energy
 - B) thermal energy
 - C) kinetic energy
 - D) mass-energy
 - E) electric potential energy
- 30) If a material is highly *opaque*, then it
- A) absorbs most light.
 - B) emits most light.
 - C) scatters most light.
 - D) reflects most light.
 - E) transmits most light.

- 31) The *wavelength* of a wave is
- A) equal to the speed of the wave times the wave's frequency.
 - B) how strong the wave is.
 - C) the distance between a peak of the wave and the next trough.
 - D) the distance between where the wave is emitted and where it is absorbed.
 - E) the distance between two adjacent peaks of the wave.
- 32) How are wavelength, frequency, and energy related for photons of light?
- A) Longer wavelength means lower frequency and higher energy.
 - B) Longer wavelength means higher frequency and lower energy.
 - C) Longer wavelength means lower frequency and lower energy.
 - D) Longer wavelength means higher frequency and higher energy.
 - E) There is no simple relationship because different photons travel at different speeds.
- 33) From lowest energy to highest energy, which of the following correctly orders the different categories of electromagnetic radiation?
- A) radio, infrared, visible light, ultraviolet, X rays, gamma rays
 - B) radio, X rays, visible light, ultraviolet, infrared, gamma rays
 - C) visible light, infrared, X rays, ultraviolet, gamma rays, radio
 - D) gamma rays, X rays, visible light, ultraviolet, infrared, radio
 - E) infrared, visible light, ultraviolet, X rays, gamma rays, radio
- 34) When an atom loses an electron, it becomes
- A) dissociated.
 - B) ionized.
 - C) sublimated.
 - D) a plasma.
 - E) an isotope.
- 35) When an electron in an atom goes from a higher energy state to a lower energy state, the atom
- A) absorbs a photon of a specific frequency.
 - B) can absorb a photon of any frequency.
 - C) absorbs several photons of a specific frequency.
 - D) emits a photon of a specific frequency.
 - E) can emit a photon of any frequency.
- 36) If two objects are the same size but one object is 3 times hotter than the other object, the hotter object emits
- A) 3 times more energy.
 - B) 9 times more energy.
 - C) 81 times more energy.
 - D) 12 times more energy.
 - E) none of the above
- 37) The spectra of most galaxies show redshifts. This means that their spectral lines
- A) have wavelengths that are shorter than normal.
 - B) have a higher intensity in the red part of the spectrum.
 - C) have wavelengths that are longer than normal.
 - D) have normal wavelengths, but absorption of light makes them appear red.
 - E) always are in the red part of the visible spectrum.

- 38) From laboratory measurements, we know that a particular spectral line formed by hydrogen appears at a wavelength of 121.6 nanometers (nm). The spectrum of a particular star shows the same hydrogen line appearing at a wavelength of 121.8 nm. What can we conclude?
- A) The "star" actually is a planet.
 - B) The star is moving away from us.
 - C) The star is moving toward us.
 - D) The star is getting hotter.
 - E) The star is getting colder.
- 39) Telescopes operating at this wavelength must be cooled to observe faint astronomical objects.
- A) extreme infrared
 - B) radio
 - C) visible
 - D) gamma-ray
 - E) X-ray
- 40) Suppose the angular separation of two stars is smaller than the angular resolution of your eyes. How will the stars appear to your eyes?
- A) The two stars will look like a single point of light.
 - B) You will not be able to see these two stars at all.
 - C) The two stars will appear to be touching, looking rather like a small dumbbell.
 - D) You will see only the larger of the two stars, not the smaller one.
 - E) You will see two distinct stars.
- 41) Which of the following statements best describes the two principal advantages of telescopes over eyes?
- A) Telescopes have much more magnification and better angular resolution.
 - B) Telescopes can collect far more light with far better angular resolution.
 - C) Telescopes can see farther without image distortion and can record more accurate colors.
 - D) Telescopes can collect far more light with far greater magnification.
 - E) Telescopes collect more light and are unaffected by twinkling.
- 42) Which of the following is *not* an advantage of the Hubble Space Telescope over ground-based telescopes?
- A) Stars do not twinkle when observed from space.
 - B) It can observe infrared and ultraviolet light, as well as visible light.
 - C) Observers on the ground can use it at any time of day (i.e., not only during their night)
 - D) It is closer to the stars.
 - E) It never has to close because of bad weather.
- 43) In what part of the electromagnetic spectrum do the biggest telescopes on Earth operate?
- A) infrared
 - B) visible
 - C) ultraviolet
 - D) radio
 - E) X-ray
- 44) How do asteroids differ from comets?
- A) Asteroids are made of icy material and are less dense than the comets, which are rockier.
 - B) Asteroids are rocky bodies and are denser than the comets, which are made of icy material.
 - C) Asteroids and comets are both made of rocky and icy material, but asteroids are smaller in size than comets.
 - D) Asteroids are rocky bodies and are less dense than the comets, which are made of icy material.
 - E) Asteroids are made of icy material and are denser than the comets, which are more rocky.

- 45) How does the Sun's mass compare with that of the planets?
- A) It is a thousand times more massive than Earth.
 - B) It is a hundred times more massive than all the planets combined.
 - C) It is about as massive as all the planets combined.
 - D) It is a thousand times more massive than all the planets combined.
 - E) It is a hundred times more massive than Earth.
- 46) Which planet has the highest *average* surface temperature, and why?
- A) Jupiter, because it is so big
 - B) Mercury, because it is closest to the Sun
 - C) Venus, because of its dense carbon dioxide atmosphere
 - D) Mars, because of its red color
 - E) Mercury, because of its dense carbon dioxide atmosphere
- 47) Which planet, other than Earth, has visible water ice on it?
- A) Jupiter
 - B) the Moon
 - C) Mars
 - D) Venus
 - E) Mercury
- 48) Which of the following is furthest from the Sun?
- A) Pluto
 - B) a comet in the Kuiper belt
 - C) Neptune
 - D) a comet in the Oort cloud
 - E) an asteroid in the asteroid belt
- 49) Which of the following is *not* an exception to the general patterns of motion in the solar system?
- A) the retrograde rotation of Triton around Neptune
 - B) the counterclockwise rotation of Venus
 - C) the large size of Earth's Moon
 - D) the rings of Saturn
 - E) the extreme axis tilt of Uranus
- 50) Which is the densest planet in the solar system?
- A) Mars
 - B) Earth
 - C) Venus
 - D) Jupiter
 - E) Mercury
- 51) The planet closest in size to Earth is
- A) the Moon.
 - B) Venus.
 - C) Pluto.
 - D) Mars.
 - E) Mercury.
- 52) Which of the following is *not* a characteristic of the inner planets?
- A) They have very few, if any, satellites.
 - B) They all have solid, rocky surfaces.
 - C) They all have substantial atmospheres.
 - D) They are relatively smaller than the outer planets.
 - E) Their orbits are relatively closely spaced.
- 53) Which of the following is *not* a characteristic of the outer planets?
- A) They are all large balls of gas.
 - B) They are primarily made of hydrogen and helium.
 - C) Their orbits are separated by relatively large distances.
 - D) They have very few, if any, satellites.
 - E) They all have rings.

- 54) Why did the solar nebula heat up as it collapsed?
- A) Nuclear fusion occurring in the core of the protosun produced energy that heated the nebula.
 - B) Radiation from other nearby stars that had formed earlier heated the nebula.
 - C) As the cloud shrank, its gravitational potential energy was converted to kinetic energy and then into thermal energy.
 - D) Collisions among planetesimals generated friction and heat.
 - E) The shock wave from a nearby supernova heated the gas.
- 55) What percentage of the solar nebula's mass consisted of *rocky* material?
- A) 80 percent B) 0 percent C) 2 percent D) 20 percent E) 0.4 percent
- 56) What kind of material in the solar nebula could remain solid at temperatures as high as 1,500 K, such as existed in the inner regions of the nebula?
- A) rocks
 - B) metals
 - C) silicon-based minerals
 - D) molecules such as methane and ammonia
 - E) hydrogen compounds
- 57) What was the *frost line* of the solar system?
- A) the distance from the Sun where temperatures were low enough for rocks to condense, between the present-day orbits of Mercury and Venus
 - B) the distance from the Sun where temperatures were low enough for hydrogen compounds to condense into ices, between the present-day orbits of Mars and Jupiter
 - C) the distance from the Sun where temperatures were low enough for asteroids to form, between the present-day orbits of Venus and Earth
 - D) the distance from the Sun where temperatures were low enough for hydrogen and helium to condense, between the present-day orbits of Jupiter and Saturn
 - E) the distance from the Sun where temperatures were low enough for metals to condense, between the Sun and the present-day orbit of Mercury
- 58) According to the nebular theory, what are asteroids and comets?
- A) They are chunks of rock or ice that condensed long after the planets and moons had formed
 - B) They are chunks of rock or ice that were expelled from planets by volcanoes.
 - C) They are the shattered remains of collisions between moons.
 - D) They are leftover planetesimals that never accreted into planets.
 - E) They are the shattered remains of collisions between planets.
- 59) The heavy bombardment phase of the solar system lasted
- A) to the present time.
 - B) several tens of millions of years.
 - C) about a billion years.
 - D) several hundreds of millions of years.
 - E) several million years.

- 60) The nebular theory of the formation of the solar system successfully predicts all but one of the following. Which one does the theory *not* predict?
- A) the compositional differences between the terrestrial and jovian planets
 - B) the craters on the Moon
 - C) Planets orbit around the Sun in nearly circular orbits in a flattened disk.
 - D) asteroids, Kuiper-belt comets, and the Oort cloud
 - E) the equal number of terrestrial and jovian planets
- 61) Rank the five terrestrial worlds in order of size from smallest to largest:
- A) Mercury, Moon, Venus, Earth, Mars.
 - B) Moon, Mercury, Venus, Earth, Mars.
 - C) Mercury, Venus, Earth, Moon, Mars.
 - D) Mercury, Moon, Mars, Earth, Venus.
 - E) Moon, Mercury, Mars, Venus, Earth.
- 62) Which of the terrestrial worlds has the strongest magnetic field?
- A) Venus
 - B) Mars
 - C) Mercury
 - D) Earth
 - E) the Moon
- 63) Which of the following most likely explains why Venus does *not* have a strong magnetic field?
- A) Its rotation is too slow.
 - B) It is too close to the Sun.
 - C) It does not have a metallic core.
 - D) It is too large.
 - E) It has too thick an atmosphere.
- 64) Which two properties are most important in determining the surface temperature of a planet?
- A) distance from the Sun and atmosphere
 - B) size and chemical composition
 - C) composition and distance from the Sun
 - D) internal temperature and atmosphere
 - E) size and atmosphere
- 65) Which of the following does *not* have a major effect in shaping planetary surfaces?
- A) magnetism
 - B) volcanism
 - C) impact cratering
 - D) tectonics
 - E) erosion
- 66) How large is an impact crater compared to the size of the impactor?
- A) 100 times larger
 - B) 10–20 percent larger
 - C) the same size
 - D) 10 times larger
 - E) 1,000 times larger

- 67) The relatively few craters that we see within the lunar *maria*
- A) are volcanic in origin, rather than from impacts.
 - B) were formed by impacts that occurred after those that formed most of the craters in the lunar highlands
 - C) were formed by impacts that occurred before those that formed most of the craters in the lunar highlands.
 - D) are sinkholes that formed when sections of the *maria* collapsed.
 - E) were created by the same large impactor that led to the formation of the *maria*.
- 68) The *Caloris Basin* on Mercury covers a large region of the planet, but few smaller craters have formed on top of it. From this we conclude that
- A) erosion destroyed the smaller craters that formed on the basin.
 - B) Mercury's atmosphere prevented smaller objects from hitting the surface.
 - C) the *Caloris Basin* formed toward the end of the solar system's period of heavy bombardment.
 - D) the *Caloris Basin* was formed by a volcano.
 - E) only very large impactors hit Mercury's surface in the past.
- 69) *Olympus Mons* is a
- A) large lava plain on the Moon.
 - B) stratovolcano on the Moon.
 - C) shield volcano on Mars.
 - D) stratovolcano on Mercury.
 - E) shield volcano on Venus.
- 70) Which of the following regions was the result of plumes of hot mantle rising in a *hot spot* within a plate?
- A) the volcano Mount St. Helens
 - B) Japan and the Philippines
 - C) Alaska's Aleutian Islands
 - D) the islands of Hawaii
 - E) all of the above
- 71) Why does Venus have such a great difference in temperature between its "no atmosphere" temperature and its actual temperature?
- A) It is so close to the Sun.
 - B) It has no cooling effects from oceans.
 - C) It has a high level of volcanic activity.
 - D) It has a large amount of greenhouse gases in its atmosphere.
 - E) It has a slow rotation.
- 72) Which of the following worlds has the most substantial atmosphere?
- A) the Moon B) Venus C) Earth D) Mercury E) Mars
- 73) What are *greenhouse gases*?
- A) gases that transmit visible light
 - B) gases that absorb visible light
 - C) gases that absorb infrared light
 - D) gases that transmit infrared light
 - E) gases that absorb ultraviolet light

- 74) There are no aurora on Venus because it
- A) lacks atmospheric oxygen.
 - B) lacks a strong magnetic field.
 - C) lacks strong winds.
 - D) lacks an ionosphere.
 - E) is too hot.
- 75) Why doesn't Venus have seasons like Mars and Earth do?
- A) Its rotation axis is not tilted.
 - B) It does not have an ozone layer.
 - C) It is too close to the Sun.
 - D) It does not rotate fast enough.
 - E) all of the above
- 76) Where is most of the water on Mars?
- A) in its clouds
 - B) in deep underground deposits
 - C) distributed evenly throughout its atmosphere
 - D) in its polar caps and subsurface ground ice
 - E) frozen on the peaks of its tall volcanoes
- 77) Why is Mars red?
- A) It is made primarily of red clay.
 - B) Its surface rocks were rusted by oxygen.
 - C) Its atmosphere scatters blue light more effectively than red light.
 - D) Its surface is made of ices that absorb red light.
 - E) Its surface is made of ices that absorb blue light.
- 78) How does Jupiter's core compare to Earth's?
- A) It is about 10 times larger both in size and mass.
 - B) It is about the same size but is 10 times more massive.
 - C) Jupiter doesn't have a core—it is made entirely from hydrogen and helium.
 - D) It is about 10 times larger in size and the same mass.
 - E) It is the same size and mass.
- 79) If we know the size of an asteroid, we can determine its density by
- A) comparing its reflectivity to the amount of light it reflects.
 - B) radar mapping.
 - C) spectroscopic imaging.
 - D) determining its mass from its gravitational pull on a spacecraft, satellite, or planet.
 - E) looking for brightness variations as it rotates.
- 80) Why is Jupiter denser than Saturn?
- A) It is made of a different composition than Saturn, including a higher proportion of hydrogen compounds and rocks.
 - B) Its core is much larger than Saturn's.
 - C) It has a greater proportion of helium to hydrogen compared to Saturn.
 - D) The extra mass of Jupiter compresses its interior to a greater extent than that of Saturn.
 - E) It is unknown why this is so.

- 81) What is Jupiter's Great Red Spot?
- A) the place where reddish particles from Io impact Jupiter's surface
 - B) a large mountain peak poking up above the clouds
 - C) a hurricane that comes and goes on Jupiter
 - D) the place where Jupiter's aurora is most visible
 - E) a long-lived, high-pressure storm
- 82) The four Galilean moons around Jupiter are
- A) a mixture of rock and ice, with the ice fraction increasing with distance from Jupiter.
 - B) all made of rock.
 - C) a mixture of rock and ice, with the rock fraction increasing with distance from Jupiter.
 - D) all made of ice.
 - E) hydrogen and helium gas.
- 83) Why are there no impact craters on the surface of Io?
- A) It is too small to have been bombarded by planetesimals in the early solar system.
 - B) Io did have impact craters but they have all been buried in lava flows.
 - C) Any craters that existed have been eroded through the strong winds on Io's surface
 - D) Jupiter's strong gravity attracted the planetesimals more strongly than Io and thus none landed on its surface.
 - E) Io's thick atmosphere obscures the view of the craters.
- 84) Which moon has the most substantial atmosphere?
- A) Titan B) Europa C) Mimas D) Ganymede E) Io
- 85) How thick are Saturn's rings from top to bottom?
- A) a few tens of thousands of kilometers
 - B) a few kilometers
 - C) a few tens of meters
 - D) a few million kilometers
 - E) a few hundred kilometers
- 86) How does the largest asteroid, Ceres, compare in size to other solar system worlds?
- A) It is about half the size of Pluto.
 - B) It is smaller than any jovian moon.
 - C) It is about the size of a large jovian moon.
 - D) It is about the size of Pluto.
 - E) It is larger than Pluto and Mercury.
- 87) Which is closest to the average distance between asteroids in the asteroid belt?
- A) 100 thousand km
 - B) 1 million km
 - C) 1 thousand km
 - D) 10 thousand km
 - E) 10 million km

- 88) Why isn't there a planet where the asteroid belt is located?
- A) A planet once formed here, but it was broken apart by a catastrophic collision.
 - B) There was too much rocky material to form a terrestrial planet, but not enough gaseous material to form a jovian planet.
 - C) The temperature in this portion of the solar nebula was just right to prevent rock from sticking together
 - D) Gravitational tugs from Jupiter prevented material from collecting together to form a planet.
 - E) There was not enough material in this part of the solar nebula to form a planet.
- 89) What do we call a small piece of solar system debris found on Earth?
- A) meteoroid
 - B) solar system debris
 - C) cometary fragment
 - D) meteorite
 - E) meteor
- 90) Halley's comet is named after the English scientist Edmund Halley because he
- A) was the first to see it in 1682.
 - B) was the first to publish pictures of it and report it to the International Astronomical Union (IAU)
 - C) discovered it.
 - D) was the most famous astronomer in England during its appearance.
 - E) calculated its orbit and predicted that it would return in 1758.
- 91) What part of a comet points most directly away from the Sun?
- A) the jets of gas
 - B) the nucleus
 - C) the dust tail
 - D) the plasma tail
 - E) the coma
- 92) Most of the planets discovered around other stars
- A) are more massive than Earth and orbit very far from the star.
 - B) are less massive than Earth and orbit very far from the star.
 - C) are less massive than Earth and orbit very close to the star.
 - D) are more massive than Earth and orbit very close to the star.
 - E) are found around neutron stars.
- 93) What is *astrometry*?
- A) searching for planets around stars
 - B) measuring the positions of stars on the sky
 - C) using metric units for distance (e.g. meters rather than light years)
 - D) measuring the velocities of stars via the Doppler effect
 - E) measuring distances to stars
- 94) Current techniques can measure stellar motion to less than
- A) walking speed.
 - B) orbital speed of Jupiter.
 - C) freeway speed.
 - D) cruising speed of an airplane.
 - E) running speed.

- 95) Why are many of the newly detected extrasolar planets called "hot Jupiters"?
- A) The planets tend to be detected around more massive, hotter stars than our Sun.
 - B) Their masses and composition are similar to what we would expect if Jupiter were hotter.
 - C) because the discovery of other planets is very exciting
 - D) Their masses are similar to Jupiter but they are very close to the central star and therefore hot.
 - E) Their masses are similar to Jupiter but their composition is similar to Mercury.
- 96) The core of the Sun is
- A) hotter and denser than the surface.
 - B) constantly rising to the surface through convection.
 - C) composed of iron.
 - D) at the same temperature but denser than the surface.
 - E) at the same temperature and density as the surface.
- 97) What two forces are balanced in what we call *gravitational equilibrium*?
- A) the strong force and gravity
 - B) outward pressure and gravity
 - C) the strong force and kinetic energy
 - D) outward pressure and the strong force
 - E) the electromagnetic force and gravity
- 98) What is the average temperature of the *surface* of the Sun?
- A) 10,000 K B) 1,000 K C) 1 million K D) 100,000 K E) 6,000 K
- 99) Which layer of the Sun do we normally see?
- A) photosphere
 - B) radiation zone
 - C) convection zone
 - D) chromosphere
 - E) corona
- 100) At the center of the Sun, fusion converts hydrogen into
- A) radiation and elements like carbon and nitrogen.
 - B) helium, energy, and neutrinos.
 - C) plasma.
 - D) radioactive elements like uranium and plutonium.
 - E) hydrogen compounds.
- 101) What is *granulation* in the Sun?
- A) another name for the way sunspots look on the surface of the Sun
 - B) elements in the Sun other than hydrogen and helium
 - C) dust particles in the Sun that haven't been turned into plasma
 - D) lumps of denser material in the Sun
 - E) the bubbling pattern on the photosphere produced by the underlying convection
- 102) The earliest evidence for life on Earth dates to
- A) about 570 million years ago.
 - B) about 2 billion years ago.
 - C) about 4.5 billion years ago.
 - D) about 3.8 billion years ago.
 - E) about 65 million years ago.

- 103) What was the *Cambrian explosion*?
- A) a dramatic diversification of life that began about 540 million years ago
 - B) the initial spark of lightning that created the first life-form from amino acids
 - C) the largest mass extinction in Earth's history
 - D) the impact of the meteor that led to mass extinction of the dinosaurs
 - E) the eruption of the volcano known as Cambria on the ancient supercontinent of Pangaea
- 104) After Mars, the next most likely candidates for life in the solar system are
- A) asteroids.
 - B) Kuiper-belt comets.
 - C) the jovian planets.
 - D) the large moons of the jovian planets.
 - E) Oort-cloud comets.
- 105) What defines the *habitable zone* around a star?
- A) the region around a star where rocky planets form
 - B) the region around a star where humans can survive
 - C) the region around a star where the ultraviolet radiation does not destroy organisms on a planetary surface
 - D) the region around a star where life exists
 - E) the region around a star where liquid water can potentially exist on planetary surfaces

Answer Key

Testname: ASTRO2STUDY

- 1) C
- 2) E
- 3) C
- 4) C
- 5) B
- 6) E
- 7) C
- 8) C
- 9) D
- 10) A
- 11) B
- 12) B
- 13) A
- 14) D
- 15) D
- 16) C
- 17) C
- 18) D
- 19) D
- 20) A
- 21) B
- 22) D
- 23) A
- 24) D
- 25) E
- 26) C
- 27) C
- 28) D
- 29) E
- 30) A
- 31) E
- 32) C
- 33) A
- 34) B
- 35) D
- 36) C
- 37) C
- 38) B
- 39) A
- 40) A
- 41) B
- 42) D
- 43) D
- 44) B
- 45) D
- 46) C
- 47) C
- 48) D
- 49) D
- 50) B

- 51) B
- 52) C
- 53) D
- 54) C
- 55) E
- 56) B
- 57) B
- 58) D
- 59) D
- 60) E
- 61) E
- 62) D
- 63) A
- 64) A
- 65) A
- 66) D
- 67) B
- 68) C
- 69) C
- 70) D
- 71) D
- 72) B
- 73) C
- 74) B
- 75) A
- 76) D
- 77) B
- 78) B
- 79) D
- 80) D
- 81) E
- 82) A
- 83) B
- 84) A
- 85) C
- 86) A
- 87) B
- 88) D
- 89) D
- 90) E
- 91) D
- 92) D
- 93) B
- 94) A
- 95) D
- 96) A
- 97) B
- 98) E
- 99) A
- 100) B

- 101) E
- 102) D
- 103) A
- 104) D
- 105) E