



Physical Science 100 CCE

Sample Multiple Choice Questions

These sample questions are grouped into four sections in accordance with the four parts into which the textbook is divided. If you do well on these sample quizzes and you study the areas in which you miss questions on these practice quizzes, you should do well on the CCE examination at the end of this course. Remember the answers are given for all of these questions at the very end of this section so that you can self-test your knowledge of this material. The questions on the actual CCE exam will be very similar to these sample questions, and you may even be pleasantly surprised to see a few of these exact questions again on the final CCE exam.

The CCE exam will NOT be divided into sections. Questions from all parts of this course will be mixed together to test your knowledge of the entire range of material covered in this textbook. Good luck with your work on this course and I hope you do well and learn a lot about Astronomy and Cosmology from your work with us at Ohio University.

Sample Quiz Part I: The Sky

(Seeds text, 10th ed., Chapters 1-5)

1. Considering the overall scale of the universe, which of the following is the largest in size?
 - a. the Milky Way Galaxy
 - b. our solar system
 - c. a galactic cluster
 - d. the Local Group
2. A “light year” is a unit used to measure:
 - a. time.
 - b. velocity.
 - c. distance.
 - d. spectrum shift.
3. Besides the Sun, the next nearest star to our planet Earth is about how far away?
 - a. 4.25 miles
 - b. 4.25 astronomical units
 - c. 4.25 kilometers
 - d. 4.25 light years
4. Most of the information that astronomers get about the universe comes to us as:
 - a. direct samples of star material.
 - b. electromagnetic radiation such as light and radio waves.
 - c. meteorite fragments.
 - d. chemical samples obtained by space probes.
5. When we look at a distant star we observe:
 - a. what it is like right now.
 - b. what it will be like some time in the future.
 - c. what it was like many years ago.
 - d. any of the above depending on the direction we look.

Sample Quiz Part I – The Sky

6. The average distance from the Sun to the Earth is:
 - a. 1 light year.
 - b. 1 kilometer.
 - c. 1 astronomical unit.
 - d. 1 power-of-ten.
7. The 88 official patterns of stars as seen in the night sky from Earth are called:
 - a. constellations.
 - b. magnitudes.
 - c. celestial spheres.
 - d. local groups.
8. An alpha or beta star is:
 - a. a very dim star.
 - b. a very bright star.
 - c. a very old star.
 - d. a very small star.
9. Easily recognized patterns of stars as seen from Earth that are NOT official constellations are properly referred to as:
 - a. asterisms.
 - b. signs of the zodiac.
 - c. star clusters.
 - d. Greek or Arabic groups.
10. Hipparchus classified the brightest stars seen in the night sky as:
 - a. 6th magnitude.
 - b. 100th magnitude.
 - c. 1st magnitude.
 - d. 20th magnitude.
11. If the apparent visual magnitude of a star is negative (-) when viewed from Earth, the star will appear to us to be:
 - a. very bright.
 - b. very dim.
 - c. so dim it can only be seen using a large telescope.
12. The Sun, when viewed from Earth, is very bright and has an apparent visual magnitude of:
 - a. 1
 - b. 100
 - c. -26.7
 - d. -93,000,000
13. The Sun appears to travel across the celestial sphere on a path called the:
 - a. ecliptic.
 - b. celestial equator.
 - c. solstice.
 - d. declination.
14. How long does it take Earth to rotate once on its own axis?
 - a. 1 year
 - b. 1 month
 - c. 1 week
 - d. 1 day
15. Which points on the celestial sphere lie directly above the Earth's equator?
 - a. the ecliptic
 - b. the celestial equator
 - c. the spring equinox
 - d. the north celestial pole
16. The brightest star in any constellation is always designated as:
 - a. first magnitude.
 - b. alpha.
 - c. 100th magnitude.
 - d. Polaris.
17. What two measurements must be made to locate the position of a star on the celestial sphere?
 - a. longitude and latitude
 - b. North-South and East-West
 - c. declination and right ascension
 - d. zenith and altitude

Sample Quiz Part I – The Sky

18. The north pole of the Earth does not always point to the same position on the celestial sphere. Its change in orientation among the fixed stars is called:
- a. precession.
 - b. declination.
 - c. the equinox.
 - d. an asterism.
19. The cycle of day and night is caused because Earth:
- a. revolves around the Sun.
 - b. has a 23.5-degree tilt to its axis of rotation.
 - c. rotates on its own axis.
 - d. moves with the Sun around the center of the Milky Way.
20. During which season of the year will the Sun shine most directly on the northern hemisphere of the Earth and also be above the horizon for more than 12 consecutive hours?
- a. Spring
 - b. Summer
 - c. Fall
 - d. Winter
21. About how long does it take for the Moon to go through one cycle of lunar phases, as from one new Moon phase to the next new Moon phase?
- a. 1 week
 - b. 1 month
 - c. 1 year
 - d. 1 light year
22. What is the cycle from one new Moon phase to the next new Moon phase called?
- a. the sidereal period
 - b. the synodic period
 - c. lunar time
 - d. solar time
23. The sidereal period of our Moon is the time needed for the Moon to revolve once around the Sun with respect to:
- a. the Sun itself.
 - b. the Earth.
 - c. the fixed stars.
 - d. the next lunar eclipse.
24. Which period of Moon revolution is longer?
- a. the sidereal period
 - b. the synodic period
 - c. neither is longer, they are just the same
25. During which phase must the Moon be between the Sun and the Earth so that a *SOLAR* eclipse can occur?
- a. new Moon
 - b. first quarter
 - c. full Moon
 - d. waxing gibbous
26. When the gravitational pull of the Moon and the Sun work together during the new or full phases of the Moon, the tides on Earth will:
- a. be exceptionally high.
 - b. be much lower.
 - c. cease to occur at all during this period of time.
27. When the Moon is directly overhead and the Sun is also directly overhead at the same time of day, the Moon must be in which phase?
- a. full
 - b. 3rd quarter
 - c. new
 - d. 1st quarter
28. After the full Moon phase, what phase does the Moon go into next?
- a. first quarter
 - b. waxing crescent
 - c. waning gibbous
 - d. new Moon

Sample Quiz Part I – The Sky

29. When all of the surface of the Sun is blocked from our sight by the Moon we would observe what type of eclipse?
- a. annular
 - b. partial solar
 - c. coronal
 - d. total solar
30. The dark region where no light from the Sun is found during an eclipse is called the:
- a. penumbra.
 - b. partial zone.
 - c. umbra.
 - d. annular ring.
31. At what time of day will the full Moon be highest in the sky for an observer on Earth?
- a. 12 noon
 - b. 6 AM
 - c. 2:45 PM
 - d. 12 midnight
32. Where must the Moon be during a lunar eclipse?
- a. between the Earth and the Sun
 - b. behind the Earth relative to the Sun
 - c. over the North Celestial Pole
 - d. behind the Sun as seen from the Earth
33. Who was an initial strong proponent for the heliocentric theory of the solar system and first published this idea?
- a. Newton
 - b. Tycho Brahe
 - c. Galileo
 - d. Copernicus
34. When a planet appears to move *BACKWARD* across the celestial background of “fixed” stars, the planet is said to be:
- a. on an epicycle.
 - b. heliocentric.
 - c. in retrograde motion.
 - d. in opposition.
35. Kepler’s **FIRST** law says that planets:
- a. move around the Sun in elliptical orbits.
 - b. are held in orbit by the gravity of the Sun.
 - c. have periods related to their average distance from the Sun.
 - d. sweep out equal areas in equal times.
36. A model which had the planets moving on a smaller perfect circle that revolves around an another larger deferent circle is said to be based on the theory of:
- a. constellations.
 - b. tidal forces.
 - c. epicycles.
 - d. phases.
37. Who first used the telescope to study the night sky?
- a. Galileo
 - b. Plato
 - c. Kepler
 - d. Einstein
38. Any planet that is directly on the opposite side of the Earth from the Sun is said to be in:
- a. conjunction.
 - b. opposition.
 - c. rotation.
 - d. quadrature.
39. The theory that wrongly assumed the Earth to be the center of the solar system was called the:
- a. Heliocentric theory.
 - b. Elliptical theory.
 - c. Newtonian theory.
 - d. Geocentric theory.

Sample Quiz Part I – The Sky

40. According to Kepler's third law, the period of time during which a planet circles the Sun is related to the cube of:
- the planet's mass.
 - the planet's brightness.
 - the average distance at which the planet orbits the Sun.
 - the amount of downward gravitational pull at the planet's surface.
41. Who developed the theory of gravity that explains the interactions between two massive celestial bodies like the Sun and Moon or the Sun and one of its planets?
- Kepler
 - Newton
 - Galileo
 - Plato
42. Light is only a small part of the full spectrum of:
- waves that need air through which to propagate.
 - electro-magnetic radiation.
 - massive particles out of which all matter is constructed.
 - waves that travel so fast that their speed is considered infinite.
43. The light-gathering power of a telescope determines the dimmest objects that can be viewed. The light-gathering power is dependent on:
- the size of the eyepiece used.
 - the magnification of the telescope.
 - the diameter of the primary objective element.
 - the length of the main telescope housing tube.
44. When light is bent as it passes into a new medium, it is said to be experiencing:
- acceleration.
 - gravitation.
 - reflection.
 - refraction.
45. About how big in diameter is the objective element of the largest ground-based radio telescope at Arecibo, Puerto Rico?
- 6 m
 - 2.4 m
 - 330 m
 - 1 m
46. How big in diameter is the Hubble Space Telescope primary mirror?
- 6 m
 - 2.4 m
 - 330 m
 - 1 m
47. The primary objective element of a reflecting optical telescope is:
- a prism.
 - a CCD sensor.
 - a lens.
 - a mirror.
48. The VLA (Very Large Array) and the Aricibo telescope are both:
- optical telescopes.
 - radio telescopes.
 - X-ray telescopes.
 - ultraviolet telescopes.
49. A spectrometer measures:
- the brightness or intensity of light from a star.
 - the position of emission or absorption lines.
 - the diameter of the Sun on other nearby stars.
 - the precession rate of the Earth's axis.

Sample Quiz Part I – The Sky

50. X-rays and gamma rays from distant stars can best be detected using telescopes based:
- at sea level on Earth.
 - on top of very high mountains.
 - on satellites in orbit around the Earth.
 - any of the above locations can be used.
51. Which two types of electromagnetic radiation can most easily travel through Earth's atmosphere so that they can be detected by ground-based telescopes?
- gamma rays and microwaves
 - X-rays and infrared radiation
 - radio waves and light
 - water waves and sound waves
52. The fastest thing traveling through space is believed to be:
- the Sun as it circles the center of the Milky Way.
 - spacecraft sent out from Earth to explore the universe.
 - electromagnetic radiation such as light and radio waves.
 - very distant galaxies as they move away from us.
53. Radio waves have ___ visible light.
- a longer wavelength than
 - a shorter wavelength than
 - the same wavelength as
54. Radio waves travel through a vacuum at ___ visible light travels through a vacuum.
- a faster speed than
 - a slower speed than
 - the same speed at which

Sample Quiz Part II: The Stars

(Seeds text, 10th ed., Chapters 6-11)

1. Which of the following particles can be moved from one orbit to another orbit around the nucleus of an atom when it interacts with a photon of light?
- neutron
 - electron
 - proton
 - alpha particle
2. The most abundant chemical element in the universe today is:
- oxygen.
 - iron.
 - carbon.
 - hydrogen.
3. What do we call an electron that has acquired more energy than it normally has in its ground state?
- excited
 - elevated
 - Doppler shifted
 - charged
4. An atom that has become ionized has:
- many electrons in levels above the ground state.
 - lost or gained one or more electrons.
 - more neutrons than protons in its nucleus.
 - been cooled to the point that it does not radiate E-M energy.

Sample Quiz Part II – The Stars

5. Neutral particles called *neutrons* and positive particles called *protons* make up the nucleus of an atom, around which are orbiting negative particles called:
 - a. electrons.
 - b. alpha particles.
 - c. photons.
 - d. isotopes.

6. The *WIDTH* of spectral lines from a star indicates:
 - a. the temperature and speed of molecular motion in the star.
 - b. if the star is moving toward us or away from us.
 - c. the type of elements present in the star.
 - d. the percent of the element present in the star.

7. The shifting of the spectrum lines in starlight *TOWARD THE RED END* of a solar spectrum is an indication that a star is:
 - a. moving toward us.
 - b. made mostly of hydrogen.
 - c. hotter than the Sun.
 - d. moving away from us.

8. Which of the following types of electromagnetic radiation has the shortest wavelength?
 - a. gamma rays
 - b. visible light
 - c. microwaves
 - d. radio waves

9. What temperature would you assign to the surface of a yellowish-colored star that you might observe in the night sky?
 - a. about 3,500 K
 - b. about 6,000 K
 - c. about 10,000 K
 - d. over 20,000 K

10. Which of the following types of spectra shows a full color band like a rainbow with no dark or bright colored lines evident?
 - a. an emission spectrum
 - b. a continuous spectrum
 - c. an absorption spectrum
 - d. a Newtonian spectrum

11. Which of the following types of spectra shows dark lines on a full color background?
 - a. an emission spectrum
 - b. a continuous spectrum
 - c. an absorption spectrum
 - d. a Newtonian spectrum

12. Which of the following types of spectra shows individual bright colored lines against a dark background?
 - a. emission spectrum
 - b. continuous spectrum
 - c. absorption spectrum
 - d. a Newtonian spectrum

13. Which spectrum class has stars with the coolest surface temperatures?
 - a. O class
 - b. A class
 - c. F class
 - d. M class

14. In which spectrum class is our own nearest star, the Sun?
 - a. B class
 - b. G class
 - c. K class
 - d. X class

15. Absorption lines in the Sun's spectrum:
 - a. indicate the direction of heat transfer in the Sun.
 - b. radiate outward into the Sun's outer corona region.
 - c. show changes that occur in the Sun's magnetic field.
 - d. tell us what elements are present in the Sun's photosphere.

Sample Quiz Part II – The Stars

16. Spicules are the primary component of the Sun's:
- a. photosphere.
 - b. chromosphere.
 - c. corona.
 - d. core.
17. When the internal radiation pressure produced within the core of a star exactly balances the inward pull of gravity, we say that the star is in:
- a. mass balance.
 - b. contraction.
 - c. equilibrium.
 - d. fusion balance.
18. The temperature of the *CORONA of our Sun* is believed to be about:
- a. 6000 degrees K.
 - b. 12,000 degrees K.
 - c. 15 million degrees K.
 - d. 1-2 million degrees K.
19. Sunspots are related to the periodic twisting up of the Sun's:
- a. magnetic field lines.
 - b. surface gas layers.
 - c. radiation zones.
 - d. Van Allen belts.
20. Sunspot maximum are seen on the Sun's surface:
- a. every day.
 - b. once each month.
 - c. every other year.
 - d. in 11 year cycles.
21. The outpouring of high speed, charged particles such as protons from the Sun is known as:
- a. an aurora.
 - b. the solar wind.
 - c. convective radiation.
 - d. magnetic anomalies.
22. What does differential rotation do to the magnetic field of the Sun?
- a. It makes it stronger year after year.
 - b. It gradually decreases it to zero.
 - c. It converts it into mass.
 - d. It twists up the field lines and then un-twists them again.
23. We study the interior of the Sun by looking at the way it vibrates (much like a bell), using a technique called:
- a. X-ray spectrometry.
 - b. helioseismology.
 - c. photometer analysis.
 - d. Sunspot observations.
24. Nuclear conversion of hydrogen to helium in the core of the Sun is called:
- a. oxidation.
 - b. melting.
 - c. solar flaring.
 - d. fusion.
25. The cells of boiling gas that cover the entire photosphere of the Sun in a salt-and-pepper pattern are referred to as:
- a. granulations.
 - b. sunspot penumbra.
 - c. corona.
 - d. absorption spectra lines.
26. The regions in space around the Sun where the corona does not extent outward as far as normal are called:
- a. coronal holes.
 - b. solar winds.
 - c. granulations.
 - d. spicules.

Sample Quiz Part II – The Stars

27. The tremendous amount of energy radiated outward from the Sun is produced:
- at the outer surface of the photosphere.
 - deep in the core of the star.
 - high above the surface in the corona region.
 - just above the surface as spicules in the chromosphere.
28. Stellar parallax can be used to measure the distance to stars that are:
- within our own solar system.
 - nearby within our own Milky Way galaxy.
 - anywhere within our own Milky Way galaxy.
 - anywhere in the known universe.
29. Main sequence stars shine because of:
- the conversion of hydrogen into helium in their cores.
 - heat generated by gravitational collapse.
 - ions formed by hot gases in convection patterns.
 - the process of combining helium atoms into carbon.
30. Compared to the size of the Sun, dwarf stars are about:
- 1/100 as large.
 - nearly the same size.
 - 100 times larger.
 - 10,000,000 times larger.
31. An H-R diagram is a plot of what two properties of the stars?
- brightness vs. distance from Earth
 - velocity of recession vs. diameter
 - luminosity vs. surface temperature
 - mass vs. Doppler red shift
32. Where is our Sun located on an H-R diagram?
- on the main sequence
 - below and to the left of the main sequence
 - above and to the right of the main sequence
 - at the extreme bottom, left hand corner since all other stars are compared to it when they are placed on this type of diagram
33. On an H-R diagram which type of stars are shown along a diagonal stripe that runs from upper left to lower right?
- black dwarf stars
 - white dwarf stars
 - red giant stars
 - main sequence stars
34. On the H-R diagram which type of stars are located below and to the left of the main sequence region?
- stars like our Sun
 - white dwarf stars
 - red giant main sequence stars
 - main sequence stars
35. On the H-R diagram which type of stars appear above and to the right of the main sequence region?
- stars like our Sun
 - white dwarf stars
 - red giant main sequence stars
 - main sequence stars
36. What is a binary star?
- any star that has two or more frequencies of light in its spectrum
 - stars with two names such as “the North Star” and “Polaris”
 - stars that have two or more Moons revolving around them
 - two or more stars held very close together by their mutual gravity

Sample Quiz Part II – The Stars

37. Which type of binary star system shows regular periodic drops in intensity because one star moves in front of the other as they orbit each other?
- a. visual
 - b. eclipsing
 - c. double
 - d. spectroscopic
38. Which type of binary star system can be detected by observing double sets of emission or absorption lines from what appears to be a single point source of light?
- a. visual
 - b. eclipsing
 - c. double
 - d. spectroscopic
39. What property of stars would be very difficult to determine if it were not for our careful study of binary star systems?
- a. luminosity
 - b. proper motion
 - c. mass
 - d. distance from our solar system
40. A diagram showing the variation in the light observed to be coming from a binary star system is called:
- a. a luminosity diagram.
 - b. a light curve.
 - c. a brightness plot.
 - d. an H-R diagram.
41. In general the interstellar medium is:
- a. about as dense as water.
 - b. mostly empty space, like a very good vacuum on Earth.
 - c. composed entirely of hot gases like the Sun's corona.
 - d. made up of nitrogen and oxygen like Earth's atmosphere.
42. A reflection nebulae:
- a. glows like a "neon" sign.
 - b. bounces light back toward the Earth from bright nearby stars.
 - c. shows up as a shadow against a distant lighted region.
 - d. emits strong 21-centimeter radiation.
43. An emission nebulae:
- a. glows like a "neon" sign.
 - b. reflects light from nearby stars.
 - c. shows up as a shadow against a distant lighted region.
 - d. emits strong 21-centimeter radiation.
44. Which of the following shows up in photographs as wispy bluish regions?
- a. cool clouds of gas
 - b. emission nebulae
 - c. dark nebulae
 - d. reflection nebulae
45. Interstellar extinction and interstellar reddening are both caused when light from distant stars travels through:
- a. dust clouds.
 - b. cool gas layers.
 - c. giant molecular clouds.
 - d. the atmosphere of our Moon.
46. The infrared cirrus effect is caused by a wispy network of interstellar:
- a. dust clouds.
 - b. cool gas layers.
 - c. giant molecular clouds.
 - d. ozone in our atmosphere.

Sample Quiz Part II – The Stars

47. What primary force causes large clouds of gas and dust to collapse into new stars?
a. radiation pressure
b. hydrogen burning
c. universal contraction
d. self-gravitation
48. In the life cycle of a star, what phase follows directly after the star's main sequence period?
a. protostar phase
b. white dwarf phase
c. red giant phase
d. supernova phase
49. What determines how long it takes for a new protostar to settle down and find its place on the H-R diagram?
a. its mass
b. its specific elemental composition
c. its CNO ratios
d. its absorption spectrum
50. When the internal radiation pressure produced within the core of a star exactly balances the inward pull of gravity we say that the star is in:
a. mass balance.
b. contraction.
c. hydrostatic equilibrium.
d. fusion balance.
51. The temperature of the core of a new main sequence star is believed to be about:
a. 300 degrees K.
b. 25,000 degrees K.
c. 10-15 million degrees K.
d. close to absolute zero.
52. Most of the energy produced in the core of a star works its way outward from the core toward the surface in the form of:
a. heat.
b. vibration.
c. nuclear fusion.
d. proton transport.
53. Protostars that show erratic changes in brightness are called:
a. emission nebulae.
b. T Tauri Stars.
c. 21-centimeter emitters.
d. proton-proton stars.
54. The fusion process in the cores of main-sequence stars is fueled by:
a. hydrogen.
b. helium.
c. carbon.
d. the alpha process.
55. The fusion process in the cores of red giant stars is fueled by:
a. hydrogen.
b. helium.
c. carbon.
d. the proton-proton process.
56. When the core of a main-sequence star collapses:
a. the temperature of the core decreases.
b. the density of the core decreases.
c. the pressure in the core of the star decreases.
d. all of the these.
57. Which uses up its core hydrogen fastest?
a. a high mass main-sequence star
b. a medium mass main-sequence star like our Sun
c. a low mass main-sequence star
d. all of the above use up hydrogen at the same rate
58. About how long will a star with a mass similar to our Sun be a main-sequence star?
a. 0.5 million years
b. 10 million years
c. 0.5 billion years
d. 10 billion years

Sample Quiz Part II – The Stars

59. About how long will a star that is 3 times as massive as our Sun be a main-sequence star?
- a. 1 million years
 - b. 10 thousand years
 - c. 0.5 billion years
 - d. 10 billion years
60. What makes a star collapse when its core fuel runs out?
- a. pressure
 - b. heat
 - c. high density
 - d. gravity
61. A red giant star appears red because:
- a. its core is much hotter than it was.
 - b. its outer layers have expanded and cooled.
 - c. its surface is contracting and shows a red shift.
 - d. its neutrinos show up as red in our detectors.
62. About what percent of its main-sequence lifetime will a star spend as a red giant?
- a. 10%
 - b. 50%
 - c. 75%
 - d. 99%
63. When helium first starts to fuse in the core of a star, that star experiences a:
- a. helium flash.
 - b. supernova explosion.
 - c. electron ionization.
 - d. proton-proton process.
64. After helium fusion starts in the core, a red giant often has hydrogen fusion begin:
- a. even deeper in its core.
 - b. at its surface.
 - c. in a shell near its core.
 - d. in its outer corona.
65. When the Sun becomes a red giant it will grow:
- a. to over 2 AU in diameter.
 - b. to equal the size of the entire solar system.
 - c. to the size of a small star cluster.
 - d. to fill all of known space.
66. Which of the following compact objects has a mass greater than 3 SM and is the final stage of a massive collapsed star?
- a. a neutron star
 - b. a black hole
 - c. a black dwarf
 - d. a white dwarf
67. Which of the following compact objects has a mass less than 1.4 SM, shines very brightly, and is supported from further collapse by electron degeneracy?
- a. a neutron star
 - b. a black hole
 - c. a black dwarf
 - d. a white dwarf
68. Which of the following compact objects has a mass between 1.4 and 3 SM and is supported from further collapse by neutron degeneracy?
- a. a neutron star
 - b. a black hole
 - c. a black dwarf
 - d. a white dwarf
69. Which of the following compact objects has a mass less than 1.4 SM, and is the final dark, burned-out cinder left from the collapse of a low-mass star?
- a. a neutron star
 - b. a black hole
 - c. a black dwarf
 - d. a white dwarf

Sample Quiz Part III: Galaxies

(Seeds text, 10th ed., Chapters 12-15)

1. The main spiral structure of the Milky Way galaxy is found in the:
 - a. halo.
 - b. central bulge.
 - c. galactic corona.
 - d. disk.
2. Where in the Milky Way are most globular clusters found?
 - a. halo
 - b. central bulge
 - c. galactic corona
 - d. disk
3. Rotation curve data suggests that there is a large amount of dark matter in our galaxy located in the:
 - a. spiral arms.
 - b. central bulge.
 - c. galactic corona.
 - d. disk.
4. One explanation for the large estimated mass of our galaxy is a super-massive black hole which is located in the:
 - a. halo.
 - b. central bulge.
 - c. galactic corona.
 - d. disk.
5. The central portion of the Milky Way galaxy is obscured from our view when we use optical telescopes by:
 - a. many globular star clusters.
 - b. the accretion disc of its central black hole.
 - c. large clouds of gas and dust.
 - d. a rapidly expanding hydrogen cloud.
6. How can we explore the central region of our galaxy behind the intervening gas and dust clouds?
 - a. by using the Hubble Space Telescope
 - b. using infrared and radio wave observations
 - c. by sending in unmanned spacecraft
 - d. any small "backyard" telescope can easily see this
7. Our home galaxy, the Milky Way, contains:
 - a. about 2 dozen stars.
 - b. only several thousand stars.
 - c. nearly all of the stars in the entire universe.
 - d. about 200 billion stars.
8. Where is our Sun located within the Milky Way galaxy?
 - a. in the exact center
 - b. within the central bulge
 - c. far out in the halo
 - d. at the edge of one of the spiral arms
9. What observations best show us the overall spiral shape of our galaxy?
 - a. maps of nova explosions
 - b. hydrogen atom spin flips in H II regions
 - c. plots showing globular cluster locations
 - d. X-rays from black hole accretion disks
10. What do the density wave theory and self-sustaining star formation theory explain?
 - a. the long-term spiral structure of our galaxy
 - b. the composition of the central core of our galaxy
 - c. the material found in the interstellar medium
 - d. the size of an event horizon of a massive black hole

Sample Quiz Part III – Galaxies

11. Our galaxy was formed from:
 - a. a large gas and dust cloud.
 - b. the outer layers of an expanding red giant star.
 - c. material left after the destruction of a black hole.
 - d. a pulsar jet that condensed into a collection of stars.

12. Most of the stars that make up spiral discs and irregular galaxies are:
 - a. Population II stars.
 - b. Population I stars.
 - c. quasars.
 - d. Cepheid variable stars.

13. The closest neighbor galaxy to our Milky Way galaxy is:
 - a. a dwarf elliptical.
 - b. the small spiral, M33.
 - c. Andromeda.
 - d. the small Magellanic Cloud.

14. A galaxy that appears from Earth to be a nearly homogeneous but highly flattened sphere of Population II stars is classified as what type of galaxy?
 - a. an EO
 - b. an irregular
 - c. an SBa
 - d. an E7

15. Which of the following is characteristic of Sa galaxies?
 - a. loosely-wound spiral arms
 - b. many easily seen Magellanic clouds
 - c. tightly-wound spiral arms
 - d. very little non-stellar gas and dust

16. How many galaxies are there in our Local Group of galaxies?
 - a. about 20
 - b. several hundred
 - c. over 10,000
 - d. about 2,000

17. The other large spiral galaxy in our Local Group is called:
 - a. The Andromeda Galaxy.
 - b. The Great Solar Galaxy.
 - c. The Magellanic Galaxy.
 - d. Milky Way II.

18. The first proof that other galaxies existed came from the observation of distant:
 - a. variable stars.
 - b. black holes.
 - c. supernova explosions.
 - d. clouds of hydrogen gas.

19. Which type of star is best described as an older star having only a small amount of the heavy metal elements?
 - a. a Population I star
 - b. a Population II star
 - c. an open cluster star
 - d. a star much like the Sun

20. Primarily what type of stars are found in elliptical galaxies?
 - a. RR Lyra stars
 - b. quasi-stellar stars
 - c. Population I stars
 - d. Population II stars

21. Seyfert galaxies produce large amounts of radio energy in:
 - a. their central core regions.
 - b. neutron star clusters.
 - c. binary star orbits near their polar regions.
 - d. wing-like clouds on either side of their centers.

Sample Quiz Part III – Galaxies

22. The main reason that quasars are believed to be very far away is because:
- Einstein's theory predicts that they are very distant.
 - they have been proven to be very bright objects.
 - they have highly red-shifted lines in their spectra.
 - they show very rapid changes in their intensity.
23. Normal looking galaxies that emit large quantities of radio waves from lobes on either side of their cores are called:
- Seyfert galaxies.
 - planetary nebulae.
 - double radio sources.
 - quasars.
24. Why do astronomers believe that the radiation-producing regions of quasars must be relatively small?
- their synchrotron emission implies a very small volume
 - they change their brightness within a few days time
 - they appear as tiny points of light in a telescope
 - their redshifts imply a greatly compressed size
25. Through an optical telescope a Seyfert galaxy is likely to look like which of the following?
- an irregular galaxy
 - a spiral galaxy
 - an elliptical galaxy
 - an open star cluster
26. Synchrotron radiation is produced by:
- all hot objects above zero degrees on the Kelvin scale.
 - high-speed charged particles in strong magnetic fields.
 - ionized H II regions.
 - electrons flipping from one spin direction to the other.
27. What is the common name used for a "quasi-stellar" object?
- BL Lac object
 - quasar
 - pulsar
 - black hole
28. Why were "quasi-stellar" objects given this name?
- They look like normal stars but have strange spectra.
 - They were once stars but have evolved.
 - They are powered by fusion like normal stars.
 - They are found in clusters like Population II stars.
29. How large are "quasi-stellar" objects thought to be? About the size of:
- the Earth.
 - a star.
 - our solar system.
 - a galaxy.
30. How can we explain the appearance of two or more identical quasars that show up very close together in our telescopes?
- Light from one quasar is passing a gravitational lens.
 - There are two identical quasars side by side in space.
 - Earth's atmosphere causes the illusion of two objects.
 - The telescope itself shows multiple images of one source.
31. An electron has an anti-particle known as the:
- proton.
 - neutron.
 - positron.
 - photon.

Sample Quiz Part III – Galaxies

32. If the average density of the universe exceeds the critical density, the universe will:
- go into a steady state.
 - eventually stop expanding and collapse back on itself.
 - expand forever.
 - become flat.
33. The maximum age of the universe as estimated by using our best estimates of its current expansion rate is called:
- parallax.
 - Hubble time.
 - the quasar limit.
 - Newton's estimate.
34. Matter is produced from pure energy in a process called:
- degeneracy.
 - a power jet reaction.
 - pair production.
 - accretion formation.
35. The strongest evidence that the universe was formed in the Big Bang explosion and still continues to expand is:
- the observable mass in the universe is insufficient to stop an expansion that may have started.
 - no matter how far out we look, we see more galaxies.
 - we have detected 3 degree microwave background radiation.
 - we can see (by looking at very distant galaxies) that the expansion rate has not slowed at all over the years.
36. Because of the four-dimensional nature of space, if the universe is infinite, the center of the universe:
- is within the Andromeda galaxy.
 - is located in the direction of the constellation Sagittarius.
 - is our own nearest star, the Sun.
 - is not defined in conventional 3-dimensional space.
37. The study of the history and structure of the universe is called:
- cosmology.
 - astrology.
 - universality.
 - Hubble time.
38. The origin of the universe is referred to as the:
- Big Crunch.
 - Big Bang.
 - Accretion Event.
 - Cosmic Birth.
39. An open universe will:
- expand forever.
 - eventually stop expanding and contract.
 - become a quasar.
 - explode again every few years.
40. If the strong nuclear force can be explained by the same theory that is used for the weak force and the electromagnetic force, the combined theory will be called the:
- cosmological theory.
 - united force theory.
 - grand unification theory.
 - theory of everything.

Sample Quiz Part IV and V: The Solar System / Life

(Seeds text, 10th ed., Chapters 16-20)

- The rings of the outer planets such as Saturn are made up of:
 - molecular hydrogen.
 - small pieces of molten iron.
 - ice formed from frozen liquid metallic hydrogen gas.
 - ice, dust and small rock fragments.
- The most abundant gas in the atmosphere of Venus is:
 - helium.
 - nitrogen.
 - carbon dioxide.
 - hydrogen.
- The two planets in our solar system whose orbits are closest to that of the Earth are:
 - Jupiter and Mars.
 - Mercury and Venus.
 - Uranus and Saturn.
 - Mars and Venus.
- The cores of the outer planets are probably made up of:
 - molecular hydrogen gas.
 - iron.
 - heavy elements.
 - liquid metallic hydrogen.
- Which of the inner planets has the highest level of oxygen in its atmosphere?
 - Mercury
 - Mars
 - Venus
 - Earth
- Within our solar system, satellites that revolve around the individual planets are known as:
 - moons.
 - terrestrials.
 - comets.
 - asteroids.
- Which planet orbits furthest from the center of the solar system?
 - Mercury
 - Uranus
 - Neptune
 - Saturn
- Which of the following is a Jovian planet?
 - Saturn
 - Mars
 - Mercury
 - Venus
- In our early solar system, the planets formed by a process called:
 - solar wind accumulation.
 - accretion.
 - angular momentum.
 - protosun collection.
- The largest Moon of Neptune is called:
 - the Moon.
 - Io.
 - Triton.
 - Ganymede.
- Which planet is closest to the Sun?
 - Mercury
 - Mars
 - Venus
 - Jupiter
- What is the name given to the first and most primitive collection of gas and dust produced in the formation of a planet during the accretion process?
 - an atmosphere
 - a meteorite
 - a planetesimal
 - a protoplanet

Sample Quiz Part IV and V – The Solar System / Life

13. The cores of the terrestrial planets are made up of:
 - a. rocky material.
 - b. molecular hydrogen gas.
 - c. metallic liquid hydrogen.
 - d. iron.
14. The outer-most layer of the Jovian planets are made up of:
 - a. rocky material.
 - b. molecular hydrogen gas.
 - c. metallic liquid hydrogen.
 - d. iron.
15. Which of the planets has almost no detectable atmosphere?
 - a. Mercury
 - b. Mars
 - c. Venus
 - d. Jupiter
16. Which of the outer gas-giant planets is closest to the Sun?
 - a. Uranus
 - b. Neptune
 - c. Jupiter
 - d. Saturn
17. What does the greenhouse effect accomplish?
 - a. produces oxygen from basic hydrogen
 - b. keeps planets spinning on their axes
 - c. traps heat from the Sun in the atmosphere
 - d. concentrates magnetic field energy near the poles
18. Which of the following is *not* a major Moon of Jupiter?
 - a. Phobos
 - b. Io
 - c. Callisto
 - d. Europa
19. Which planet in our solar system has the highest average density?
 - a. Mercury
 - b. Neptune
 - c. Jupiter
 - d. Earth
20. The most commonly accepted explanation for the current structure of our solar system is given by:
 - a. the Big Bang Theory.
 - b. the nucleo-synthesis principle.
 - c. the Solar Nebula Theory.
 - d. the Greenhouse Effect.
21. Which part of a comet's tail curves outward from its head?
 - a. the ion tail
 - b. the comma tail
 - c. the dust tail
 - d. the iceball tail
22. The asteroid belt is located between the orbits of which two planets in our solar system?
 - a. Venus and Earth
 - b. Uranus and Neptune
 - c. Mars and Jupiter
 - d. Mercury and Venus
23. The large asteroid whose orbit allows it to approach closest to the Sun is named:
 - a. Apollo.
 - b. Ceres.
 - c. Juno.
 - d. Icarus.
24. What prevented the loose material now located in the asteroid belt from forming into a planet?
 - a. There is not enough material in this region of space.
 - b. The gravity of the Sun and Jupiter interacted to prevent it.
 - c. Nuclear explosions broke up the material several times.
 - d. It did form, but a collision with a comet broke it up again.

Sample Quiz Part IV and V – The Solar System / Life

25. If a body in the asteroid belt is smaller than about 100 meters it is not called an asteroid but is called:
- a. a minor planet.
 - b. a comet.
 - c. a meteoroid.
 - d. a protoplanet.
26. Comets are divided into two main classes. These are:
- a. short-period comets and long-period comets.
 - b. inner comets and outer comets.
 - c. ion comets and dust comets.
 - d. bright comets and dim comets.
27. Another descriptive name used for a comet is:
- a. protoplanet.
 - b. dirty iceball.
 - c. meteorite.
 - d. interstellar wanderer.
28. The head of a comet is made up of porous rock and ice and is also often referred to as:
- a. the nucleus.
 - b. the hydrogen envelope.
 - c. the comma.
 - d. the Oort cloud.
29. Most of the meteoroids that intersect the orbit of the Earth as it travels around the Sun are believed to be related to the debris leftover from the break-up of:
- a. comets.
 - b. man-made satellites.
 - c. fragments of our own Moon.
 - d. solar winds.
30. In the formation of planets, *differentiation* refers to:
- a. the formation of the inner and the outer planets.
 - b. the settling of heavier material to their central regions.
 - c. the distribution of planets within the Oort Cloud.
 - d. the presence or absence of an atmosphere around each planet.
31. It is currently believed that complex molecules are:
- a. easily formed throughout most of space.
 - b. formed only in the immediate vicinity of Earth.
 - c. cannot be formed at all without the help of man.
 - d. were only made in the earliest moments of the Big Bang explosion.
32. An electrical spark is probably necessary to convert water, ammonia, and simple hydrocarbons into:
- a. a protoplanet.
 - b. atmospheric gases.
 - c. amino acids.
 - d. individual stable atoms.
33. Today it is generally believed by scientists that the development of life in many different locations throughout the universe is:
- a. almost impossible.
 - b. only slightly feasible from current observations.
 - c. highly possible, but we have no idea of how common it may be yet.
 - d. certain because we have found it in several locations already.
34. In our own solar system, it is currently believed that the most likely place for us to find simple life forms may be:
- a. on the far side of our own Moon.
 - b. on Mercury near its polar ice caps.
 - c. on the Moons of Jupiter or Neptune.
 - d. in the core of the Sun.

Sample Quiz Part IV and V – The Solar System / Life

35. For advanced life forms to evolve on other planets, we currently believe that such planets must be:
- a. very recently formed.
 - b. much further from its primary star than Earth is from our Sun.
 - c. in a solar system that has been stable for millions of years.
 - d. completely devoid of an external atmosphere.

(Answer Key on the following page)

Answer Keys for Multiple-choice Questions

Sample Quiz Part I: The Sky (Chapters 1-5)

1. c	9. a	17. c	25. a	33. d	41. b	49. b
2. c	10. c	18. a	26. a	34. c	42. b	50. c
3. d	11. a	19. c	27. c	35. a	43. c	51. c
4. b	12. c	20. b	28. c	36. c	44. d	52. c
5. c	13. a	21. b	29. d	37. a	45. c	53. a
6. c	14. d	22. b	30. c	38. b	46. b	54. c
7. a	15. b	23. c	31. d	39. d	47. d	
8. b	16. b	24. b	32. b	40. c	48. b	

Sample Quiz Part II: The Stars (Chapters 6-11)

1. b	13. d	25. a	37. b	49. a	61. b	73. a
2. d	14. b	26. a	38. d	50. c	62. a	74. a
3. a	15. d	27. b	39. c	51. c	63. a	75. d
4. b	16. b	28. b	40. b	52. a	64. c	76. c
5. a	17. c	29. a	41. b	53. b	65. a	77. a
6. a	18. d	30. a	42. b	54. a	66. b	78. a
7. d	19. a	31. c	43. a	55. b	67. d	79. b
8. a	20. d	32. a	44. d	56. d	68. a	80. c
9. b	21. b	33. d	45. a	57. a	69. c	
10. b	22. d	34. b	46. a	58. d	70. a	
11. c	23. b	35. c	47. d	59. c	71. b	
12. a	24. d	36. d	48. c	60. d	72. d	

Sample Quiz Part III: Galaxies (Chapters 12-15)

1. d	7. d	13. d	19. b	25. b	31. c	37. a
2. a	8. d	14. d	20. d	26. b	32. b	38. b
3. c	9. b	15. c	21. a	27. b	33. b	39. a
4. b	10. a	16. a	22. c	28. a	34. c	40. c
5. c	11. a	17. a	23. c	29. c	35. c	
6. b	12. b	18. a	24. b	30. a	36. d	

Sample Quiz Parts IV and V: The Solar System/Life (Chapters 16-20)

1. d	6. a	11. a	16. c	21. c	26. a	31. a
2. c	7. c	12. c	17. c	22. c	27. b	32. c
3. d	8. a	13. d	18. a	23. d	28. a	33. c
4. c	9. b	14. b	19. d	24. b	29. a	34. c
5. d	10. c	15. a	20. c	25. c	30. b	35. c