

ES - Chapter 24 & 25 Study Guide

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. Which of the following is NOT a form of electromagnetic radiation?
- a. radio waves
 - b. gravity
 - c. gamma rays
 - d. visible light
- ___ 2. Which color has the longest wavelength?
- a. red
 - b. blue
 - c. green
 - d. orange
- ___ 3. Gamma rays, X-rays, visible light, and radio waves are all types of ____.
- a. nuclear energy
 - b. chromatic aberration
 - c. ultraviolet radiation
 - d. electromagnetic radiation
- ___ 4. The fact that light can exert a pressure on matter suggests that it is made of particles called ____.
- a. electrons
 - b. protons
 - c. photons
 - d. neutrons
- ___ 5. The energy of a photon is related to its ____.
- a. rate of movement
 - b. mass
 - c. wavelength
 - d. size
- ___ 6. What does a prism do?
- a. combines the colors of visible light into white light
 - b. separates sunlight into ultraviolet and infrared radiation
 - c. separates visible light into several colors
 - d. changes the wavelength of electromagnetic waves
- ___ 7. Which type of spectrum can be produced by a solid, liquid, or gas?
- a. emission spectrum
 - b. absorption spectrum
 - c. discontinuous spectrum
 - d. continuous spectrum
- ___ 8. What information does a star's spectrum offer about the star?
- a. size
 - b. chemical composition
 - c. age
 - d. none of the above
- ___ 9. Which type of spectrum is associated with the radiation of most stars?
- a. absorption spectrum
 - b. emission spectrum
 - c. discontinuous spectrum
 - d. continuous spectrum
- ___ 10. Which of the following refers to the change in wavelength that occurs when an object moves toward or away from a source?
- a. Doppler effect
 - b. chromatic aberration
 - c. spectroscopy
 - d. wave theory of light

- ___ 11. What will happen to an object's wavelength as the object moves toward you?
- a. The wavelength will be shortened.
 - b. The wavelength will be lengthened.
 - c. The wavelength will not change.
 - d. The wavelength will vary.
- ___ 12. Large Doppler shifts indicate ____.
- a. low speeds
 - b. high speeds
 - c. low temperatures
 - d. high temperatures
- ___ 13. Using the Doppler effect, astronomers can determine a star's ____.
- a. temperature
 - b. chemical composition
 - c. movement toward or away from Earth
 - d. age
- ___ 14. A refracting telescope produces an image using a(n) ____.
- a. mirror
 - b. spectroscope
 - c. objective lens
 - d. prism
- ___ 15. A reflecting telescope produces an image using a(n) ____.
- a. concave mirror
 - b. lens
 - c. prism
 - d. antenna
- ___ 16. When several radio telescopes are wired together, the resulting network is called a radio ____.
- a. interferometer
 - b. receiver
 - c. antenna
 - d. refractor
- ___ 17. The magnification of a telescope is changed by changing the ____.
- a. eyepiece
 - b. wavelength
 - c. focal length of the objective
 - d. objective lens
- ___ 18. Which property of an optical telescope is associated with sharper images?
- a. light-gathering power
 - b. resolving power
 - c. magnifying power
 - d. chromatic aberration
- ___ 19. The layer of the sun that radiates most of the light that reaches Earth is the ____.
- a. photosphere
 - b. corona
 - c. chromosphere
 - d. ionosphere
- ___ 20. The outermost layer of the sun is called the ____.
- a. ionosphere
 - b. photosphere
 - c. corona
 - d. chromosphere
- ___ 21. Which part of the sun lies directly above the visible "surface" of the sun?
- a. photosphere
 - b. chromosphere
 - c. corona
 - d. ionosphere
- ___ 22. The sun's surface has a grainy texture produced by numerous bright markings called ____.
- a. granules
 - b. umbras
 - c. sunspots
 - d. solar flares
- ___ 23. The thin red rim seen around the sun during a total solar eclipse is called the ____.
- a. aurora
 - b. chromosphere
 - c. corona
 - d. photosphere

- ___ 24. The sun's surface is made up mostly of ____.
- a. helium
 - b. ammonia
 - c. hydrogen
 - d. oxygen
- ___ 25. Streams of electrons and protons that shoot out from the sun's corona make up the solar ____.
- a. atmosphere
 - b. wind
 - c. rays
 - d. granules
- ___ 26. What are the most explosive events that occur on the sun?
- a. umbras
 - b. prominences
 - c. solar flares
 - d. solar winds
- ___ 27. By observing sunspots, Galileo concluded that the sun ____.
- a. was dying
 - b. was solid
 - c. rotated on its axis
 - d. dimmed and brightened
- ___ 28. Sunspots appear dark because they are ____.
- a. relatively cool
 - b. relatively hot
 - c. deep holes
 - d. solid areas
- ___ 29. What effect do solar flares have on Earth?
- a. auroras
 - b. global warming
 - c. magnetic pole reversal
 - d. tides
- ___ 30. The product of nuclear fusion is ____.
- a. hydrogen
 - b. oxygen
 - c. helium
 - d. nitrogen
- ___ 31. The source of the sun's energy is ____.
- a. chemical burning
 - b. nuclear fission
 - c. nuclear fusion
 - d. photosynthesis
- ___ 32. In the equation $E = mc^2$, what does c represent?
- a. gravitational attraction
 - b. atomic mass
 - c. speed of light
 - d. chemical composition
- ___ 33. The sun can continue to exist in its present stable state for about another ____.
- a. 5.5 billion years
 - b. 10 billion years
 - c. 15.5 billion years
 - d. 100 billion years
- ___ 34. Stars of which color have the highest surface temperature?
- a. red
 - b. orange
 - c. yellow
 - d. blue
- ___ 35. A star with a surface temperature between 5000 K and 6000 K appears ____.
- a. blue
 - b. red
 - c. yellow
 - d. white

- ___ 36. The mass of a star can be determined by studying ____.
- a. the wavelength of light emitted by the star
 - b. the color of the star
 - c. the distance between the star and Earth
 - d. binary star systems
- ___ 37. Stars of which color have the coolest surface temperature?
- a. red
 - b. orange
 - c. yellow
 - d. blue
- ___ 38. A light-year is approximately ____.
- a. 9.5 trillion kilometers
 - b. 95 trillion kilometers
 - c. 150 million kilometers
 - d. 150 billion kilometers
- ___ 39. Stellar distances are usually expressed in what units?
- a. miles
 - b. kilometers
 - c. light-years
 - d. none of the above
- ___ 40. Which of the following is true about parallax?
- a. It is used to measure distances to stars.
 - b. The parallax angles of distant stars are too small to measure.
 - c. The nearest stars have the smallest parallax angles.
 - d. both a and b
- ___ 41. The measure of a star's brightness is called its ____.
- a. magnitude
 - b. parallax
 - c. intensity
 - d. color index
- ___ 42. Which of the following does NOT affect the apparent brightness of a star?
- a. how old the star is
 - b. how big the star is
 - c. how hot the star is
 - d. how far away the star is
- ___ 43. If star A is farther from Earth than star B, but both stars have the same absolute magnitude, what is true about their apparent magnitude?
- a. Both stars have the same apparent magnitude.
 - b. Star A has the greater apparent magnitude.
 - c. Star B has the greater apparent magnitude.
 - d. Apparent magnitude is not related to distance.
- ___ 44. Which magnitude would be associated with the brightest star?
- a. 15
 - b. 10
 - c. 5
 - d. -5
- ___ 45. The difference in the brightness of two stars with the same surface temperature is attributable to their ____.
- a. densities
 - b. colors
 - c. ages
 - d. sizes

- ___ 46. Which of the following is NOT a type of nebula?
- a. reflection
 - b. emission
 - c. spiral
 - d. dark
- ___ 47. A Hertzsprung-Russell (H-R) diagram shows the relationship between ____.
- a. absolute magnitude and apparent magnitude
 - b. temperature and absolute magnitude
 - c. parallax and temperature
 - d. apparent magnitude and parallax
- ___ 48. About 90 percent of stars on the H-R diagram are ____.
- a. supergiants
 - b. main-sequence stars
 - c. white dwarfs
 - d. black holes
- ___ 49. Which main-sequence stars are the most massive?
- a. red
 - b. orange
 - c. yellow
 - d. blue
- ___ 50. Which main-sequence stars are the least massive?
- a. red
 - b. orange
 - c. yellow
 - d. blue
- ___ 51. Another name for the interstellar matter that will eventually form a star is ____.
- a. supernova
 - b. red giant
 - c. black hole
 - d. nebula
- ___ 52. A star is said to be born when ____.
- a. a protostar reaches a temperature high enough for nuclear fusion to begin
 - b. a red giant collapses on itself and becomes a black hole
 - c. pressure within a protostar becomes so great that a supernova occurs
 - d. a dark, cool interstellar cloud begins to contract
- ___ 53. Which force is most responsible for the formation of a star?
- a. gravity
 - b. nuclear force
 - c. interstellar force
 - d. electromagnetic force
- ___ 54. In the Milky Way, the most abundant gas in emission nebulae is ____.
- a. helium
 - b. hydrogen
 - c. argon
 - d. nitrogen
- ___ 55. Massive stars terminate in a brilliant explosion called a ____.
- a. red giant
 - b. protostar
 - c. neutron star
 - d. supernova
- ___ 56. Which stars are composed of matter in which electrons have combined with protons?
- a. black holes
 - b. black dwarfs
 - c. white dwarfs
 - d. neutron stars
- ___ 57. All stars, regardless of size, eventually ____.
- a. turn into black dwarfs
 - b. explode
 - c. run out of fuel and collapse
 - d. become black holes

- ___ 58. In the cores of extremely hot red giants, nuclear reactions convert helium to ____.
- a. carbon
 - b. hydrogen
 - c. lead
 - d. argon
- ___ 59. Before being engulfed, matter that is pulled into a black hole should become very hot and emit ____.
- a. infrared radiation
 - b. hydrogen nuclei
 - c. atoms
 - d. X-rays
- ___ 60. When a main-sequence star has exhausted the fuel in its core, it becomes a ____.
- a. black hole
 - b. black dwarf
 - c. neutron star
 - d. red giant
- ___ 61. The sun is a ____.
- a. black hole
 - b. black dwarf
 - c. main-sequence star
 - d. red giant
- ___ 62. What is the next stage in the sun's life cycle?
- a. white dwarf
 - b. red giant
 - c. planetary nebula
 - d. black dwarf
- ___ 63. What will be the final stage in the sun's life cycle?
- a. white dwarf
 - b. red giant
 - c. planetary nebula
 - d. black dwarf
- ___ 64. Light cannot escape the intense gravitational pull of a ____.
- a. black hole
 - b. black dwarf
 - c. main-sequence star
 - d. red giant
- ___ 65. Our galaxy is called the ____.
- a. Local Group
 - b. Orion
 - c. Andromeda
 - d. Milky Way
- ___ 66. Where is our sun located in the Milky Way?
- a. within one of the spiral arms
 - b. at the exact center of the galactic nucleus
 - c. in the galactic halo
 - d. at the tip of one of the spiral arms
- ___ 67. About 60 percent of all known galaxies are classified as ____.
- a. spiral galaxies
 - b. elliptical galaxies
 - c. irregular galaxies
 - d. binary systems
- ___ 68. Which object is largest?
- a. globular cluster
 - b. galaxy
 - c. star
 - d. planet
- ___ 69. Which of the following is NOT a type of galaxy?
- a. nebular
 - b. irregular
 - c. spiral
 - d. elliptical

- ___ 70. According to Hubble's law, galaxies are retreating at a speed that is proportional to their ____.
- orientation
 - distance
 - galactic position
 - mass
- ___ 71. Which of the following indicates that the universe is expanding?
- red shift of distant galaxies
 - red shift of the galaxies in the Local Group
 - blue shift of distant galaxies
 - blue shift of the Milky Way
- ___ 72. Based on the observed red shifts in the spectral lines of distant galaxies, astronomers conclude that ____.
- Earth is in the center of the universe
 - the universe is contracting
 - the universe is expanding
 - the universe is smaller than once believed
- ___ 73. Greater red shifts in the spectra of galaxies indicate ____.
- faster speeds
 - slower speeds
 - higher temperatures
 - lower temperatures
- ___ 74. According to the big bang theory, the universe began about ____.
- 4.5 billion years ago
 - 13.7 billion years ago
 - 49.6 billion years ago
 - 130 billion years ago
- ___ 75. Which of the following supports the big bang theory?
- pulsars
 - cosmic background radiation
 - galactic clusters
 - irregular galaxies

Completion

Age	Atmosphere	Big Bang	Black Holes	Brightness, Earth	Cepheid Variables
Chromatic Aberration		Constellations		Core	Electromagnetic Spectrum
Focal Length		Hot, Low	Irregular	Light	Magnifying Power
Prominences		Protostar	Pulsars	Redder, Lengthened	Reflecting
					Spiral
					2/3

76. The speed of light is _____ kilometers per second.
77. _____ refers to the arrangement of electromagnetic waves according to their wavelengths and frequencies.
78. An emission spectrum is produced by a(n) _____ gas under _____ pressure.
79. The light from a source that is moving away from an observer appears _____ than it actually is because its waves are _____.
80. _____ is the distance between the objective lens and the focus of a telescope.

81. Because the focus of a(n) _____ telescope is in front of the mirror, an observer must be able to view the image without blocking too much incoming light.
82. _____ refers to a telescope's ability to make an object larger.
83. Because lenses act like a prism to separate colors of the spectrum, they produce a troublesome effect known as _____.
84. Space telescopes orbit above Earth's _____ and thus produce clear images.
85. The outermost portion of the solar atmosphere, the _____, is very weak and only visible when the photosphere is covered.
86. During periods of high solar activity, huge cloudlike structures called _____ appear as great arches that extend from the sun.
87. Nuclear fusion takes place in the sun's _____.
88. Patterns of stars called _____ were originally named in honor of mythological characters or great heroes.
89. The most basic way to measure the distance to a star is _____.
90. A light-year is the distance _____ travels in a year.
91. Apparent magnitude refers to a star's _____ as it appears from _____.
92. Some stars, called _____, get brighter and fainter in a regular pattern.
93. A(n) _____ is a developing star not yet hot enough to engage in nuclear fusion.
94. Stars that radiate short pulses of radio energy are called _____.
95. The most dense stars known to exist are called _____.
96. The sun is positioned about _____ of the way from the center of the galaxy.
97. The Milky Way is classified as a(n) _____ galaxy.
98. In addition to size and shape, one of the major differences among galaxies is the _____ of their stars.
99. A(n) _____ galaxy is a type of galaxy that lacks symmetry.
100. The _____, which occurred in an instant, marks the beginning of the universe.