

Astronomy Final Exam Study Guide

1. Daily motion is diurnal. Yearly motion is annual.
2. The Celestial equator lies directly above the Earth's equator. The Celestial North Pole lies directly above the Earth's North Pole.
3. All objects in the sky rise in the East and set in the West because the Earth is rotating from West to East.
4. The Earth is closest to the Sun when it is winter in North America.
5. When the moon and sun lie exactly in the same direction in the sky, then there is a New moon.
6. The Sun rises exactly due west and exactly due east on March 21 and September 23.
7. The constellations change throughout the year because the Earth revolves around the Sun.
8. The Earth has seasons because the ecliptic is tilted in respect to the celestial equator.
9. A full Moon occurs when the Earth is between the Sun and the Moon.
10. The Moon sets about 50 minutes later each day.
11. A solar eclipse will be seen when there is a _____ Moon.
12. The _____ model puts the Sun at the center of the Solar System. The _____ model puts the Earth at the center of the Solar System.
13. The Sun's apparent path on the celestial sphere is on the _____.
14. During a solar eclipse the _____ casts a small circular shadow on the _____.
15. Copernicus put the _____ at the center of the Solar System, with all the planets having _____ orbits.
16. Kepler's _____ law says that Venus completes a full orbit faster than Neptune.
17. Kepler's _____ law says that planets do not move with a constant speed.
18. Erastosthenes determined the circumference of the Earth by comparing the _____ of the Sun at different locations on the Earth.
19. Ptolemy put the _____ at the center of the Solar System.
20. Pythagoras said that the shape of the Earth is a _____.
21. The point of closest approach of a planet to the Sun is called _____. The point of furthest approach of a planet to the Sun is called _____.
22. A planet will move faster when it is _____ to the Sun.
23. Retrograde motion occurs when two planets _____ each other in their orbits.
24. Your mass will be _____ on any planet.
25. For an object to accelerate, it must change its _____ or _____.
26. Force = _____ x _____.
27. The same force is applied to two objects. One object is twice as large as the first. This means the acceleration of the smaller will be _____ as large.
28. If a 100 kg person in space pushes away from an object that is 1000 kg, and the satellite is moving at 1 m/s, the acceleration of the person would be _____ m/s per second.
29. If the masses of the Sun and Earth were each doubled, then the force of gravity between them would increase _____ times.
30. _____ are groups of stars that represent objects such as animals and people.
31. The speed of light _____ when it passes through glass or water.
32. _____ waves are measured in millimeters to hundreds of meters.

33. Hottest stars will be _____ in color, while cool stars will be _____ in color.
34. Comparing red and blue light, _____ light has a shorter wavelength.
35. An _____ is the range of wavelengths of electromagnetic radiation which transmits through the Earth's atmosphere.
36. A _____ is a particle of light.
37. The spectrum of a star will appear _____ if the star is moving away from the Earth.
38. Comparing blue and red light, _____ light has a longer wavelength.
39. The two most important properties of a telescope is its _____ gathering power and its _____ power.
40. Light is _____ when it passes through water.
41. Comparing a 6-inch telescope with a 10-inch telescope, it is the _____-inch scope that will have a better resolution.
42. High mountains are better for telescopes because the atmosphere is thinner, and there is less pollution from light and smog.
43. Why do stars twinkle?
44. The product of the wavelength and frequency of a wave is equal to the _____ of the wave.
45. If the wavelength of a wave is 10 meters and the frequency of the wave is 10 meters, then the speed of the wave is _____ meters per second.
46. A _____ telescope uses glass lenses instead of mirrors.
47. The _____ Effect is a change in frequency and wavelength due to motion between the source and the observer.
48. If someone punches you and you are thrown backward, you are experiencing Newton's _____ law.
49. Your weight on the moon would be about _____ that of on the Earth.
50. The _____ is the speed you must achieve in order leave the gravitational pull of an object.
51. While riding a bicycle, if you stop pedaling you will still continue to move forward due to _____.
52. Newton used a modified version of Kepler's 3rd law to determine the _____ of a celestial object.
53. When you slam on the brakes in a car, and you suddenly lurch forward, this is an application of Newton's 1st law.
54. A person's weight can change depending on the gravity of a body, but a person's mass will stay the same.
55. The North Star is called _____.
56. The constellation _____ is the queen, and looks like a "W" in the sky.
57. A refracting telescope uses _____.
58. A _____ telescope reflects light with mirrors, with the image focusing at the back of the telescope.
59. We can't see the dark side of the moon because the moon makes one _____ on its axis for every _____ around the Earth.
60. The speed of light is _____ m/s.
61. The most current research shows that the expansion of the universe is _____.
62. We can't see dark matter, but we know it exists because it _____ light as it passes through it.
63. The distance from the Earth to the Sun is _____ AU.
64. The distance from the Sun to the Earth is _____ AU.
65. The Sun rises in the East and sets in the West.

66. It is the _____ of a star that determines how it will live and die.
67. A star is born when hydrogen is _____ into helium.
68. A star is in hydrostatic equilibrium when the radiation pressure outward is the same as the gravitational force inward.
69. The last element that a star can fuse is _____.
70. _____ is the most important force that determines the evolution of a star.
71. The energy from stars comes from the fusion of hydrogen into helium.
72. A planetary nebula will have a _____ at its center.
73. We can't see black holes, but we know we are there because of the effects they have on nearby objects.
74. The escape velocity at the event horizon of a black hole is the speed of light.
75. Not even light can escape the gravitational pull of a black hole. That is why it is called a black hole.
76. Our galaxy is called the _____ galaxy.
77. Our galaxy is about _____ light years across.
78. We are about 2/3 of the way out from the center of our galaxy.
79. A reflection nebula appears blue.
80. An emission nebula appears red.
81. Our galaxy has a radius of about _____ light years.
82. Our galaxy is about _____ billion years old.
83. The background radiation of the universe is at _____ cm.
84. The background radiation pattern that we "hear" throughout the universe occurs because of the flip of the spin of hydrogen atoms.
85. The center of our galaxy has a supermassive black hole that is _____ million solar masses.
86. "E" galaxies are elliptical and range from 0 to 7.
87. The most elliptical galaxy is an _____.
88. A supercluster of galaxies is where several dozen galaxies are grouped together.
89. When one galaxy "eats" another, this is called _____.
90. Almost all galaxies are held together by the _____ black holes at their center.
91. Quasars are extremely bright objects that are extremely red shifted, and extremely distance, often occur in pairs, and are relatively small in size (less than a light year across).
92. Hubble found that galaxies that are further away from us will have light that is greatly _____.
93. Black holes are also detected by the emission of _____ from their accretion disks.
94. The _____ Theory describes the creation of the universe.
95. The cosmic microwave background (CMB) radiation is radiation from the birth of the universe.
96. The younger universe was _____ and _____.
97. The CMB shows that the universe is expanding and cooling.
98. The study of the structure and origin of the universe is called _____.
99. The expansion of the universe is _____.
100. Dark energy makes up about _____% of the known universe.
101. The universe is about _____ billion years old.
102. According to the Big Bang Theory, most of the hydrogen and helium in the universe formed in the first 3 minutes.
103. The universe is _____, which means it looks the same in all directions.

104. Hubble's Law says that the universe is expanding; the universe is much denser than it is now, the universe had a beginning, and the universe has no center place.
105. The CMB is greatly red shifted.
106. The presence of _____ is necessary for the universe to continue expanding.
107. The Big Bang occurred _____.
108. The universe is an _____ universe, which means it will expand forever.
109. Our galaxy is a barred galaxy, not a spiral galaxy.
110. The largest galaxies in the universe are elliptical.
111. Hubble was able to calculate the distance to nearby galaxies by observing _____ variables.
112. All of the asteroids in the asteroid belt make up a tiny fraction of Earth's mass.
113. A fragment that burns up in the Earth's atmosphere is called a _____.
114. A meteor shower occurs when the Earth's orbit intersects the left over debris of a _____.
115. Comets all come from the _____.
116. The massive gravity of the planet _____ creates Kirkwood Gaps in the asteroid belt.
117. Comets travel the furthest from the Sun.
118. The tail of a comet always points _____ from the Sun.
119. The masses of the Jovian planets (from smallest to largest) is Uranus, Neptune, Saturn, and Jupiter.
120. _____ is the smallest planet.
121. _____ is the largest planet.
122. _____ has a axial tilt of 89 degrees.
123. Uranus has the most extreme seasons.
124. _____ has the lowest density, and could float in water.
125. The moon _____ may have a liquid water ocean, just under the frozen surface.
126. Uranus and Neptune appear blue because the gas _____ in their atmospheres strongly absorb red colors of light, thus reflecting blue.
127. All the Jovian planets have rings, and made mainly of _____ and _____, and have very thick atmospheres.
128. The energy that stirs the circulation patterns of Jupiter's atmosphere comes from its interior heat.
129. The moons around Jupiter get _____ dense with increasing distance from the planet.
130. The giant red spot on Jupiter is a great _____ that has been observed for over 300 years.
131. The terrestrial planets in order from smallest to largest is _____, _____, _____, _____.
132. The only planet that has plate tectonics is _____.
133. _____ is the hottest terrestrial planet.
134. _____ has the greatest variation in day and night temperatures.
135. _____ is actually upside down.
136. Venus and Mars have the most similar atmospheric compositions.
137. _____ is the closest in size to the Earth.
138. _____ is the smallest of the terrestrial planets.
139. The atmosphere of Venus is mainly _____.

140. When it rains on Venus, it rains _____.
141. The atmosphere of Mars is mainly _____.
142. Mercury has the greatest temperature variations.
143. There is _____ star in our Solar System.
144. There are _____ planets in our Solar System.
145. The furthest objects that are in orbit around the Sun are many icy objects found in the _____.
146. _____ are planets that have been discovered beyond our Solar System.
147. The nebular hypothesis that a planet begins as an interstellar cloud, condenses into a solar nebula, has accretion occur, takes hits from other planetesimals, and then finally forms a planet.
148. Comets are composed mainly of _____ while asteroids are composed mainly of _____.
149. Smaller planets have little or no atmosphere because there is not enough _____ to hold it in place.
150. The age of our Solar System is about _____ billion years old.
151. When you see stars at night, these stars are in our galaxy only.
152. The largest canyon and the largest volcano are found on the planet _____.
153. The terrestrial planets do not have rings.
154. When our Sun runs out of fuel, it will expand to a red giant, then shrink to a white dwarf, then cool to become a brown or black dwarf.
155. Our Sun is classified as a _____ on the HR diagram.
156. The most volcanically active moon in the Solar System is _____; a moon of Jupiter.
157. _____ has a cyclonic storm like Jupiter, and has the highest wind speeds ever recorded.
158. A solar eclipse occurs when the moon is between the Earth and the Sun.
159. The Moon is tilted _____ degrees on its axis. This is why we don't get eclipses twice a month.
160. The great hunter in the sky is called _____.

Kepler's Three Laws

- The path of the planets about the sun is elliptical in shape, with the center of the sun being located at one focus. (The Law of Ellipses).
- An imaginary line drawn from the center of the sun to the center of the planet will sweep out equal areas in equal intervals of time. (The Law of Equal Areas).
- The ratio of the squares of the periods of any two planets is equal to the ratio of the cubes of their average distances from the sun. (The Law of Harmonies).

Newton's Three Laws

- Every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it.
- $F=ma$ (Force equals mass times acceleration).
- For every action there is an equal and opposite reaction.