

Astronomy 01

Graded Test Due June 4 2018

Name: _____

ID: A

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This means you will not give or receive unpermitted aid during this quiz.

Test Chapters 15, 16, 17, 18, 19 & 20

True/False

Indicate whether the statement is true or false. (1-Point Each)

- ___ 1. The cosmological principle states that any observer in any galaxy will see the same general features of the universe.
- ___ 2. The central part of Earth's core is solid.
- ___ 3. The night sky is dark because the universe is neither static nor infinitely old.
- ___ 4. Jupiter was probably influential in preventing the formation of a planet at the present location of the asteroid belt.
- ___ 5. Achondrites are rich in volatiles.
- ___ 6. The rings of Uranus were discovered by the Voyager 2 spacecraft.
- ___ 7. If Uranus had no moon, it would probably not have rings.
- ___ 8. Earth's magnetic field is generated in the iron rich mantle.
- ___ 9. Satellites that lack craters are generally old, inactive bodies.
- ___ 10. During its early history, the universe was dominated by matter.
- ___ 11. Heterogeneous accretion means that all of the particles that formed a planet had the same composition.
- ___ 12. Jupiter's interior is mostly liquid helium.
- ___ 13. Both Jupiter and Saturn contain liquid metallic hydrogen.
- ___ 14. Most of the elements heavier than helium were made during the first few minutes after the big bang.
- ___ 15. The size of Olympus Mons suggests that the crust of Mars is very thick.
- ___ 16. Although Uranus and Neptune have no liquid metallic hydrogen in their interiors, they do have magnetic fields.
- ___ 17. The Earth never passed through the cratering stage in planetary development.
- ___ 18. If life is to develop on a planet, the planet must lie just inside the inner edge of its star's life zone.
- ___ 19. The greenhouse effect occurs because carbon dioxide is opaque to infrared radiation.
- ___ 20. The type II tail of a comet always points toward the sun.
- ___ 21. Saturn's belts and zones are obscured by haze high in its atmosphere.
- ___ 22. The dirty snowball theory suggests that the head of a comet is composed of ices.
- ___ 23. The oldest objects found so far in our solar system are Earth rocks that are 3.9 billion years old.

- ___ 24. Venus is very hot because its atmosphere is rich in carbon dioxide.
- ___ 25. Jupiter's ring is composed of particles about the size of tennis balls.
- ___ 26. The oldest parts of Earth's crust are located along the midocean rifts.
- ___ 27. Jupiter radiates less heat than it absorbs from the sun.
- ___ 28. Mercury's smooth plains are probably the oldest parts of the crust.
- ___ 29. When particles in the solar nebula grew large enough, they stopped growing by accretion and began growing by condensation.
- ___ 30. The moon stopped evolving because it is too small to have kept its internal heat.
- ___ 31. The wavelengths that are most likely for communication with other civilizations are those in the water hole.
- ___ 32. Flow channels on Venus suggest it was once rich in water.
- ___ 33. The Jovian planets have lower average densities than the terrestrial planets.
- ___ 34. Meteorites seem to be primarily composed of material very similar to the material in comets.
- ___ 35. Saturn's rings are composed of icy particles.
- ___ 36. The rings around Uranus and Neptune are confined by shepherd satellites.
- ___ 37. The present motions of the planets were inherited from the rotation of the solar nebula.
- ___ 38. The meteors in meteor showers are believed to be the debris left behind in comet orbits.
- ___ 39. Jupiter's intense magnetic field traps high energy particles from the solar wind and forms a radiation belt around the planet.
- ___ 40. DNA molecules cannot be altered by chance errors in reproduction.

Multiple Choice

Identify the choice that best completes the statement or answers the question. (3-Points Each)

- ___ 41. What limitation(s) make it impossible to travel between stars?
 - I. Fuel requirements
 - II. The tremendous distances between stars
 - III. The finite speed at which objects can travel
 - a. I
 - b. II
 - c. III
 - d. II & III
 - e. I, II, & III
- ___ 42. The oxygen in Earth's atmosphere
 - a. was manufactured inside stars.
 - b. was added to the atmosphere by plant life.
 - c. has grown more abundant since the origin of Earth.
 - d. all of these
 - e. none of these

- _____ 43. A meteor shower is produced when
- a large number of sporadic meteors are observed.
 - Earth passes through the asteroid belt.
 - massive particles are carried outward from the sun by the solar wind and enter Earth's atmosphere.
 - Earth passes through the orbital path of a comet.
 - meteors cause condensation in the upper atmosphere that leads to early morning rains.
- _____ 44. Most of the asteroids orbit the sun in a belt between the orbits of
- Venus and Earth.
 - Earth and Mars.
 - Jupiter and Saturn.
 - Mercury and Venus.
 - Mars and Jupiter.
- _____ 45. Which hypothesis concerning the formation of the moon makes predictions that best fit the observed lunar data?
- The large impact hypothesis
 - The fission hypothesis
 - The capture hypothesis
 - The condensation hypothesis
 - The regolith hypothesis
- _____ 46. The short-period comets do not have randomly oriented orbits because
- they are affected by the sun's gravity.
 - they are affected by the solar wind.
 - they formed in the Kuiper Belt, a belt shaped region in the plane of the solar system.
 - their orbits are altered by the drag of their tails in the solar wind.
 - they all were originally objects ejected from the asteroid belt.
- _____ 47. The current atmosphere of Earth is believed to be
- the remnants of the original gas from the solar nebula attracted by the protoplanet.
 - the result of the melting and vaporizing of the glaciers from the last ice age.
 - composed primarily of hydrogen and helium.
 - composed of gases that were baked from the rocks sometime after the planet formed.
 - the result of a collision between the sun and another star.
- _____ 48. The rotation of Uranus is peculiar in that
- it is much slower than is typical for Jovian planets.
 - it is much faster than is typical for Jovian planets.
 - the equator rotates much faster than the poles.
 - the axis is nearly parallel to the plane of its orbit.
 - it can not be measure because Uranus has no surface features.
- _____ 49. Saturn's F ring and the rings of Uranus are similar in that
- they are made of dark material.
 - they are made of icy material.
 - they are found near large moons.
 - they show well defined spokes.
 - the are very narrow

- ___ 50. Which of the following is not a characteristic of the terrestrial planets?
- low average density
 - orbits inside the asteroids
 - craters in old surfaces
 - small diameters
 - very few satellites
- ___ 51. Earth's magnetic field is generated by the dynamo effect in the
- molten metallic core.
 - solid central core.
 - plastic mantle.
 - the crust.
 - aurora.
- ___ 52. The flow patterns found on the surface of Mars suggest
- that Mars is a water-rich world.
 - that the climate on Mars was different in the past.
 - that volcanism is occurring on Mars.
 - that the polar caps are made of water.
 - all of the above
- ___ 53. A bit of matter that enters Earth's atmosphere and survives to reach the ground is called
- a meteor.
 - a meteoroid.
 - a meteorite.
 - a minor planet.
 - an asteroid.
- ___ 54. _____ are round bits of glass found in some stony meteorites.
- chondrites
 - anthrosites
 - achondrites
 - Widmanstätten patterns
 - chondrules
- ___ 55. Life on Earth is based on
- carbon chemistry.
 - helium chemistry
 - silicon chemistry.
 - oxygen chemistry.
 - nitrogen chemistry.
- ___ 56. The Miller experiment created
- life.
 - artificial proteins.
 - DNA.
 - simple molds.
 - amino acids.
- ___ 57. Earth possesses few visible craters and the moon possesses many. This is because
- Earth formed later than the moon and, therefore hasn't encountered as many meteoroids.
 - the moon doesn't have an atmosphere that could burn up many of the meteorites before impacting.
 - erosion and plate tectonics have slowly removed evidence of past cratering on Earth.
 - all of the above
 - only b and c

- _____ 58. The cosmic background radiation comes from a time in the evolution of the universe
- when protons and neutrons were first formed.
 - when the big bang first began to expand.
 - the inflationary period
 - when gamma rays had enough energy to destroy nuclei
 - when electrons began to recombine with nuclei to form atoms.
- _____ 59. The particles in Jupiter's ring
- must be silicate particles.
 - must be particles of ices.
 - must be metallic particles.
 - must be pieces of captured comets.
 - must be material from eruptions of volcanoes on Io.
- _____ 60. Saturn's atmosphere is
- more brightly marked than Jupiter's.
 - rich in free oxygen.
 - hazy above the clouds.
 - all of the above
 - none of the above
- _____ 61. The Widmanstätten patterns found in some meteorites show that the material
- cooled very slowly.
 - cooled very rapidly.
 - was never heated to the point of being molten.
 - was molten just before it entered Earth's atmosphere.
 - is composed primarily of organic compounds.
- _____ 62. Though Titan is small, it is able to retain an atmosphere because
- it is very cold.
 - it is very dense.
 - it rotates very slowly.
 - it attracts gas from the solar wind.
 - it has a very strong magnetic field.
- _____ 63. If the universe is closed and infinite, then
- the universe has a center and an edge.
 - the universe will expand forever.
 - the final fate of the universe will be very cold and of extremely low density.
 - the space-time of the universe is negatively curved
 - none of the above
- _____ 64. Belt-zone circulation is not easily visible on Uranus because
- no clouds form in the pure hydrogen atmosphere.
 - there is no differential rotation.
 - clouds form very deep in the atmosphere.
 - the atmosphere is stirred by cyclonic circulation.
 - there is no liquid metallic core.
- _____ 65. The most important effect in clearing the solar nebula of gas and dust was
- impacts by planetesimals.
 - the solar wind.
 - the sun's magnetic field.
 - the asteroid belt.
 - radiation pressure.

- _____ 66. Belt and zone circulation
- has been observed only on Jupiter.
 - is caused by the planet's magnetic field.
 - is caused by rising and sinking gases.
 - is more obvious on Saturn than Jupiter.
 - explains the formation of Cassini's division.
- _____ 67. The excess heat produced by Jupiter and Saturn is the result of
- nuclear reactions in their liquid metallic hydrogen cores.
 - radioactive decay.
 - hot molten lava rising to the surface.
 - the continual slow contraction of each planet.
 - the large number of meteorite and comet impacts that occur each year.
- _____ 68. Why is it believed that life can not evolve on a planet that orbits a spectral type A, B or O star?
- These stars produce too much infrared radiation which would destroy carbon-based organisms.
 - These stars have very small life zones.
 - These stars are not capable of producing planets.
 - These stars do not remain on the main sequence long enough for life to evolve.
 - These stars take too long to form.
- _____ 69. The theory that Mercury shrank slightly when it was young has been proposed to explain
- extended lava plains.
 - large craters.
 - magnetic field.
 - lobate scarps.
 - regolith.
- _____ 70. Saturn's rings are
- composed of ice particles.
 - in the plane of the planet's equator.
 - within the planet's Roche limit.
 - all of the above
 - none of the above
- _____ 71. Pluto's density is 1.8 g/cm^3 . This implies that
- Pluto has a large iron-nickel core.
 - Pluto is about 50% water and 50% rocky material.
 - Pluto should have a magnetic field about one-third as strong as Earth's.
 - Pluto is still geologically active.
 - Pluto probably has a small ring system that hasn't yet been detected.
- _____ 72. The youngest parts of Earth's crust are
- the bottom layer found in the walls of the Grand Canyon.
 - the continents.
 - the continental margins.
 - the Appalachian Mountains.
 - the midocean rifts.
- _____ 73. If the Hubble constant, H , is larger at great distances, then the
- universe must be older than we suspect.
 - matter in the universe is not important to its motion.
 - expansion is slowing.
 - all of the above
 - none of the above

- ___ 74. The type I, or gas, tail of a comet
- is smooth and featureless with a spectrum identical to that of the sun.
 - is present even when the comet is located in the region of the Kuiper belt.
 - is unaffected by the magnetic field of the sun.
 - always points toward the sun.
 - is streaked and shows emission lines of ionized atoms.
- ___ 75. Which of the solar system objects listed below is most similar to Earth in terms of mass and density?
- Mercury
 - Moon
 - Venus
 - Mars
 - Deimos
- ___ 76. The life zone is
- the region on a planet where conditions are acceptable for life to exist.
 - a region around a star where a planet's temperature would permit the existence of liquid water.
 - very small for a massive star.
 - only found around G and K stars.
 - a region on a young planet where amino acids can begin to form DNA molecules.
- ___ 77. The planets all lie in nearly the same plane resulting in a disk like structure for the solar system. This disk like structure is believed to exist because
- the original solar nebulae had a disk-like structure.
 - the bipolar flow from the young sun cleared all material out of the nebula except that in the disk.
 - Jupiter's gravity was great enough to pull all of the other planets to the plane of its orbit.
 - planetesimals settled into the plane.
 - the sun's magnetic field slowed down the rotation of the solar nebula.
- ___ 78. Uranus and Neptune appear blue because
- their atmospheres absorb blue light very efficiently.
 - both of them have very small masses for Jovian planets.
 - their surfaces are covered with water and their clouds are very thin
 - their atmospheres absorb red light very efficiently.
 - the wind speeds are very high and show a strong blue shift.
- ___ 79. The assumption of isotropy states that
- the universe looks the same at all epochs.
 - the universe looks the same from all locations over sufficiently great distances.
 - the universe looks the same in all directions over sufficiently great distances.
 - all of the above
 - none of the above.
- ___ 80. The condensation sequence suggests that _____ should condense closest to the sun.
- Jovian planets
 - metals and metal oxides
 - silicates
 - ices of water, methane, and ammonia
 - low density materials

- ___ 81. The assumption of universality states that
- the universe looks the same at all epochs.
 - the universe looks the same from all locations over sufficiently great distances.
 - the universe looks the same in all directions over sufficiently great distances.
 - the physical laws we observe on Earth apply everywhere in the universe.
 - all of the above
- ___ 82. Both Jupiter and Saturn
- have liquid metallic hydrogen in their interiors.
 - have rings.
 - emit more energy than they absorb from the sun.
 - have belt and zone circulation.
 - all of the above
- ___ 83. The age of the solar system is believed to be approximately 4.6 billions years based on the data from
- samples of lunar rocks.
 - samples of Earth rocks.
 - samples of meteorites.
 - all of the above
 - none of the above.
- ___ 84. That the moon has no magnetic field implies that
- the moon is spinning too slowly to produce a magnetic field.
 - the interior of the moon is too hot to produce a magnetic field.
 - the crust of the moon is so thick that the magnetic field can not get out of the interior
 - the moon's core contains little if any molten iron.
 - the moon is moving further from Earth.
- ___ 85. Chondrites are meteorites that have
- never been heated.
 - been heated sufficiently to release the volatiles it contained.
 - been heated sufficiently to melt the chondrules.
 - been completely melted.
 - entered Earth's atmosphere but will be destroyed before reaching the ground.
- ___ 86. Europa has few craters because
- it is protected from impacts by Jupiter's gravity.
 - it does not have a solid surface.
 - it has erased craters nearly as fast as they have formed.
 - its surface is not strong enough to support craters.
 - it keeps one face always pointed toward Jupiter which screens it from incoming meteorites.
- ___ 87. Which of the following is not produced by plate tectonics?
- mid-ocean ridges
 - rift valleys
 - the ring of fire
 - the Appalachian Mountains
 - Earth's magnetic field
- ___ 88. The DNA molecule can be altered
- by chance mismatching of base pairs.
 - by damage from exposure to radioactivity.
 - if the host cell is intelligent and determines that an alteration would help the cell survive.
 - all of the above
 - a and b above

- ___ 89. Which of the Galilean satellites are geologically active?
- Io and Callisto
 - Ganymede and Titan
 - Titan and Callisto
 - Europa and Io
 - Ganymede and Callisto
- ___ 90. The lunar maria are
- the lava plains of the lunar lowlands.
 - the smooth plateaus of the lunar highlands.
 - less than one billion years old.
 - moving plates of lunar crust.
 - older than the lunar highlands.
- ___ 91. A(n) _____ is a solar system object that enters Earth's atmosphere and becomes very hot due to friction between the object and Earth's atmosphere.
- asteroid
 - meteor
 - comet
 - meteoroid
 - planetesimal
- ___ 92. An offspring born with altered DNA due to radioactivity, cosmic rays, or errors in reproduction
- is called a mutation.
 - is called a new species.
 - is more likely to survive than if its DNA were not altered.
 - is no different than if its DNA were unchanged
 - will never be able to reproduce itself.

Matching

Match each of the planets with their moons. (3-Points Each)

For the following satellites of our solar system, select the correct planet for the satellite.

- | | |
|------------|------------|
| a. Mercury | e. Jupiter |
| b. Venus | f. Saturn |
| c. Earth | g. Uranus |
| d. Mars | h. Neptune |

- ___ 93. Io
- ___ 94. Nered
- ___ 95. Titania
- ___ 96. Europa
- ___ 97. Miranda
- ___ 98. Phobos
- ___ 99. Oberon
- ___ 100. Titan
- ___ 101. Callisto
- ___ 102. Deimos
- ___ 103. Triton
- ___ 104. Ganymede
- ___ 105. Umbriel

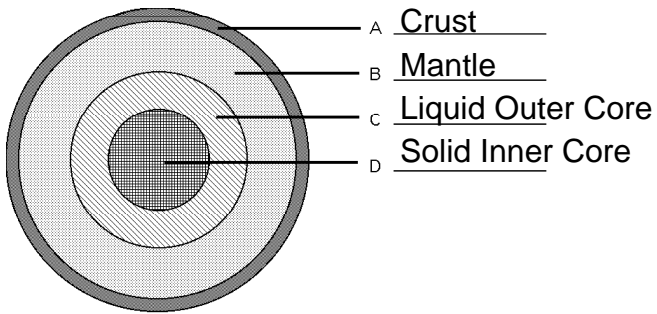
___ 106. Ariel

Fill In the Blank

Complete each of the following statements. (5-Points Each)

107. The dirty snowball model is used as a model for the physical structure of _____.

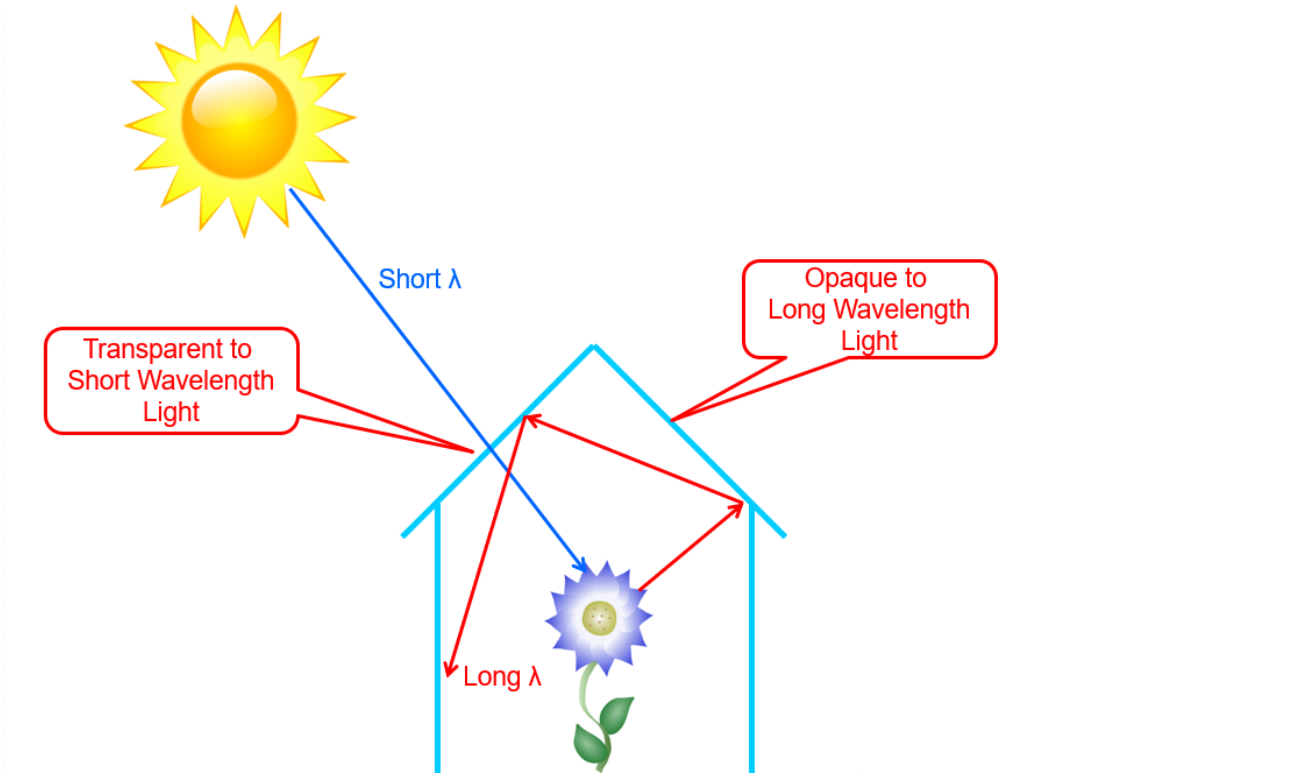
108. In the diagram below, label each of the major divisions of Earth's interior.



Short Answer

Provide a short answer for the following question. (5-Points or More Each)

109. Describe the greenhouse effect .
(Use the following diagram if necessary.)



110. What part of the radio spectrum is thought most likely to be successful for communication with other civilizations? Why?

111. Where has the run-away green house occurred?

112. How can the big bang still be visible?
In what form has it been detected?

113. Where has the green house effect occurred?

114. Describe four effects that helped to clear the solar nebula.

115. Name the four stages of development for a terrestrial planet.

116. Why is the ozone layer in Earth's atmosphere important to life on its surface?

117. List two factors that determine the rate of loss of a planet's atmosphere.

118. What evidence do we have that Earth has a molten core?

119. Explain how we can determine the relative ages of lunar features.
