

# Astronomy 01

Graded Test Due June 4 2018

Name: \_\_\_\_\_

ID: A

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By taking this test it is implied that you agree with Los Angeles Mission College's Code of Academic Honor and Integrity.  
***This means you will not give or receive unpermitted aid during this quiz.***

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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  $1.8 \text{ g/cm}^3$ . 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 |

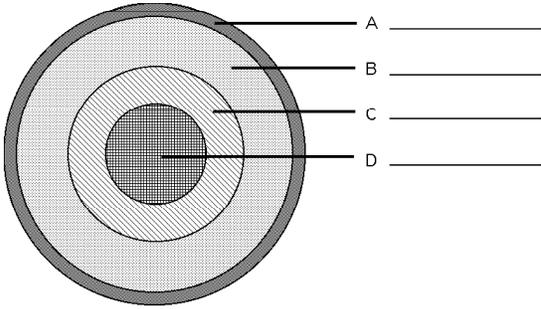
- \_\_\_ 93. Io
- \_\_\_ 94. Nered
- \_\_\_ 95. Titania
- \_\_\_ 96. Europa
- \_\_\_ 97. Miranda
- \_\_\_ 98. Phobos
- \_\_\_ 99. Oberon
- \_\_\_ 100. Titan
- \_\_\_ 101. Callisto
- \_\_\_ 102. Deimos
- \_\_\_ 103. Triton
- \_\_\_ 104. Ganymede
- \_\_\_ 105. Umbriel

\_\_\_ 106. Ariel

**Fill In the Blank**

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

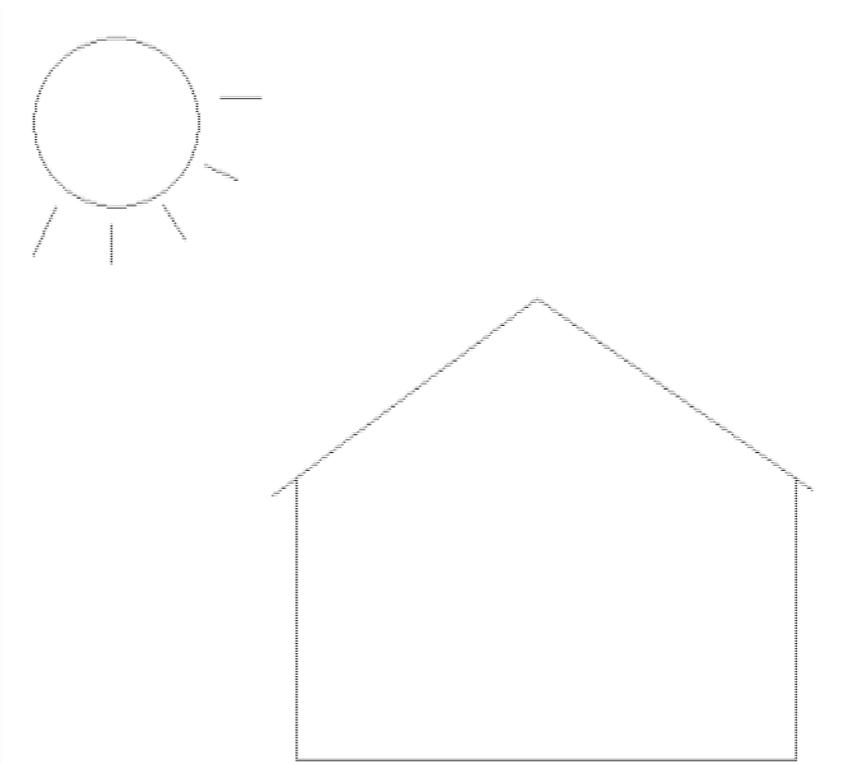
107. The dirty snowball model is used as a model for the physical structure of \_\_\_\_\_.
108. In the diagram below, label each of the major divisions of Earth's interior.



**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.)



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

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

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

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113. Where has the green house effect occurred?

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

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

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

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

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

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

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