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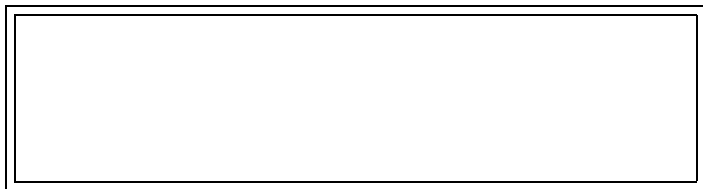
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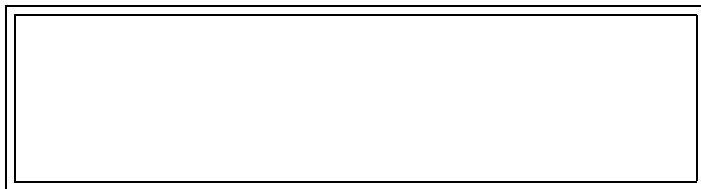
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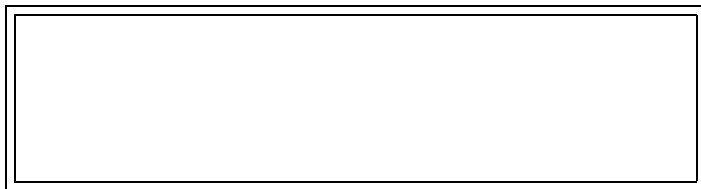
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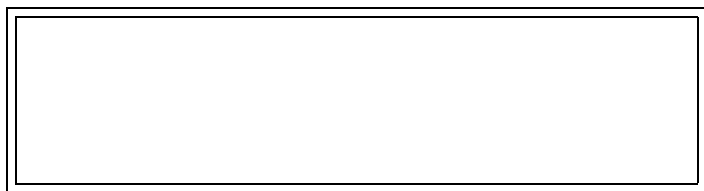
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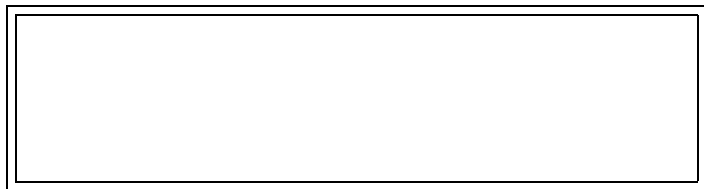
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1 pt [*] The energy levels 1-4 of Hydrogen are 0, 10.2, 12.1, and 12.8 electron volts (eV), respectively. The Hydrogen is so cool that the electrons are all in level 1. The Hydrogen gas absorbs photons of energy 12.1 eV. When the electrons lose energy, light of ___ different energies will be emitted.

30. 1
 more than 3
 3
 2
-

1 pt [*] Do the lamps L & R at the front of the room emit thermal (black body) radiation?

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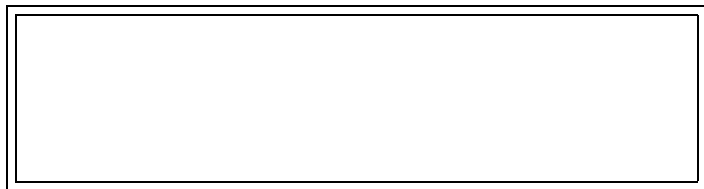
32. A More than half
 B Almost all
 C Half
 D Little
 E Less than half

1 pt [*] A giant hand suddenly doubled the mass of the sun and adjusted the motion of the earth to keep it in the same path. The giant hand would have had to make the earth___.

33. A move the same
 B move slower
 C move faster

1 pt

[*] Suppose a new comet is discovered with a period of 29.5 years, which is the same as that of Saturn. The orbit of the comet is highly elliptical. Saturn is 9.5 AU from the sun. Draw the orbits of the comet and Saturn. Be certain to include the sun. Your drawing must show accurate relative sizes.



34. *Leave blank on scoring form*

Test2

Name: _____

1 pt Which equation is the Roche limit for the case where the moon and planet have the same density? [Use these equations as a reminder.]

- A $KE=3/2kT$, where T is temperature.
- B $R=2.5R_{planet}$.
- C $KE=1/2 m v^2$, where v is the speed
- D $v^2 > 2GM_{planet}/R_{planet}$, where v is the speed.

1 pt The specific purpose of the 4.1-meter primary mirror of the SOAR Telescope is to

- A refract light.
- B take pictures.
- C analyze light into its colors.
- D collect light.

1 pt To achieve the same angular resolution, a radio telescope is much larger than an optical telescope because

- A radio waves are weaker.
- B the wavelength of radio waves is much longer.
- C radio telescopes must be more precise.
- D optical telescopes must be more precise.

1 pt [*] Consider this hypothetical discovery, which consists of three statements. S1: A planet is discovered beyond the orbit of Pluto. S2: Its density is 5 times the density of water. S3: It has many craters.would be very surprising.

- A None of the statements
- B S1, S2, & S3
- C S2 & S3
- D S3
- E S2

1 pt Which is not a moon of Jupiter?

- A Callisto
- B Ganymede
- C Titan
- D Io
- E Europa

Test2

Name: _____

1 pt You are equipped with a suit that supplies air to breathe and keeps you warm or cool. On which of these moons or planets could you not land?

- A Mars
- B Pluto
- C Callisto
- D Saturn

1 pt The planet that is fourth closest to the sun is

- A Mars.
- B Jupiter.
- C Venus.
- D Earth.
- E Saturn.

1 pt Potassium 40, which decays into argon 40, is used to figure out the age of meteorites. Why is there no argon 40 in the meteor when it formed?

- A No argon 40 had been produced in the solar system when the meteor formed.
- B Argon condenses at an extremely low temperature.
- C Argon collected in the massive asteroids.
- D All the argon collected in the jovian planets.

1 pt The age of the solar system is ___ years.

- A 13 Billion
- B 1 Billion
- C 4.5 Billion
- D 65 Million

1 pt What triggered the collapse of the gas cloud that became the solar system.

- A A supernova, an exploding star
- B Gravity
- C The pressure of a massive star
- D The Big Bang

1 pt Which one of these statements is true for the nucleus of Halley's comet?

- A It is made mostly of carbon.
- B It is about the size of Michigan.
- C Its shape is roughly spherical.
- D It is very black.
- E Its surface is uniform.

1 pt Why does the tail of a comet point away from the sun?

- 12. Gas from the comet, heated by the sun, pushes the tail away from the sun.
- The solar wind blows gas and dust away from the sun.
- The magnetic field of the sun keeps the tail pointing away.
- Conservation of angular momentum keeps the tail pointing away.

1 pt Which of the following statements comparing the jovian interiors is not thought to be true?

- 13. They all have the same exact set of internal layers, though these layers differ in size.
- Deep inside them, they all have pressures far higher than that found on the bottom of the ocean on Earth.
- They all have cores of roughly the same mass.
- They all have cores that contain at least some rock and metal.

1 pt The clouds on the surface of Jupiter are not made of condensed

- 14. water.
- ammonia.
- ammonium hydrosulfide.
- hydrogen.

1 pt Why can the material in the rings of Jovian planets not collect to form moons?

- 15. The rings are too thin
- The rings are not made of sticky material
- The rings are inside the Roche limit
- There is not enough material

1 pt Which of the following best explains what we think happened to outgassed water on Venus?

- 16. Ultraviolet light split the water molecules, and the hydrogen then escaped to space.
- Water was removed from the atmosphere by chemical reactions with surface rock.
- It turned into carbon dioxide by reacting with nitrogen in Venus's atmosphere.
- It is frozen in craters near the poles.

1 pt Astronomers believe that Mars had liquid water in the past because

- 17. microscopic fossils were found.
- the space probe Odyssey found water ice.
- photographs show dry riverbeds.
- photographs show smooth rocks

1 pt Why does Venus have so much more atmospheric gas than Earth?

- 18. Earth has lost much more gas to thermal escape than has Venus.
- Earth has lost much more atmospheric gas than Venus, primarily to condensation of water vapor into liquid water and to chemical reactions that make carbonate rock.
- Venus has gained much more gas through outgassing than has Earth.
- Because of its lack of magnetic field, Venus has been able to gain gas through the process of bombardment, while Earth has not gained gas in this way.

3 pt [*] Uranus was able attract helium (mass=4) and molecular hydrogen (mass=2) to the core, which formed first. Assume that Uranus cannot keep a gas with mass=1. Imagine a hypothetical planet core formed at the same location with the same size and 1/10 as much mass. What is the minimum mass of the gas that this hypothetical planet can attract and keep?

- 19. 10
- 20
- 2
- 40
- 4

1 pt Which is evidence that Io, one of Jupiter's moons, has a hot interior.

- 20. Io has high radioactivity.
- Jupiter radiates a lot of infrared light.
- Io has volcanoes.
- Io is close to Jupiter.

1 pt What is the source of the energy that heats Io?

- 21. Infrared radiation from Jupiter.
- Motion of the moons.
- Solar energy.
- Radioactivity.

Test2

Name:

1 pt [*] Hydrogen and helium make up more than 98% of the mass of the proto solar system. Carbon, nitrogen, and oxygen make up 1%. Metals and other elements make up 0.6%. Why did the hydrogen and helium that was in the vicinity of the forming Earth not end up on the present Earth? R1: It was too hot for these to condense. R2: The solid earth was not massive enough to hold on to these gases. R3: The solar wind blew these gasses away. The main reasons are. [Hint: Test your reasons with the case of Jupiter.]

22. A R1 & R2.
 B R1, R2, & R3.
 C R1 & R3.
 D R2 & R3.
-

1 pt What happened to the metals that were in the vicinity of the forming Earth?

23. A They became asteroids.
 B They were driven off by the solar wind.
 C They are primarily in the core of the earth.
 D The Jovian planets accreted them.
-

1 pt A giant hand suddenly moves the earth farther from the Sun. The temperature of the Earth cools. Which process would certainly happen and cause the temperature to rise.

24. A There is more plant matter.
 B There is less rain.
 C Volcanoes are more active.
 D Plate tectonics become more active.
-

1 pt The space probe Odyssey found that in regions north and south of 60 degrees latitude the surface is 50% water ice by volume. How is it that Odyssey was able to detect this water?

25. A Odyssey detected the differences in the energy of the neutrons coming off the surface of the planet.
 B The density of the surface was greater where there is no water.
 C The Odyssey sent a surface probe down to collect samples.
 D The color of the surface is different where there is water.
 E The temperature of the surface is cooler where there was so much ice.
-

Test2

Name:

1 pt Which of the following best explains what we think happened to outgassed water on Venus?

26. A It is frozen in craters near the poles.
 B Water was removed from the atmosphere by chemical reactions with surface rock.
 C Ultraviolet light split the water molecules, and the hydrogen then escaped to space.
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1 pt Which of the following is not a general characteristic of the four jovian planets in our solar system?

27. A They are composed of mainly hydrogen, helium, and hydrogen compounds.
 B They are much more massive than any of the terrestrial planets.
 C They lack solid surfaces.
 D They are higher in average density than are the terrestrial planets.
-

1 pt The planets near the sun have a high density because

28. A The lighter materials escaped the planets gravity
 B The sun evaporated the lighter materials
 C The sun prevented the lighter materials from condensing.
 D The lighter materials could not condense because the proto planet fell too far and became too hot.
-

1 pt The Hubble Space Telescope orbits the Earth, even though it is far inside the Roche limit. The Hubble Space telescope is not broken apart because

29. A The density of the Space Telescope is too high.
 B The Roche limit will cause the Space Telescope to break up after some time.
 C the Roche limit does not apply to something held together by atomic bonds.
 D Gravity does not apply to weightless conditions.
-

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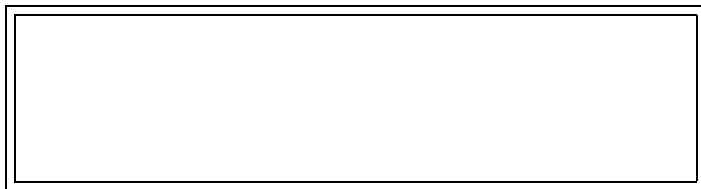
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