

1. Our most detailed knowledge of the jovian planets comes from
 - A) ground based visual telescopes.
 - B) manned missions.
 - C) spacecraft exploration.
 - D) the Hubble Space telescope.
 - E) ground based radio telescopes.
2. The spacecraft Cassini went into orbit around
 - A) Jupiter.
 - B) Pluto.
 - C) Neptune.
 - D) Uranus.
 - E) Saturn.
3. The Galileo mission put a spacecraft into orbit around Jupiter. Which statement is true?
 - A) A saltwater ocean was discovered on Jupiter.
 - B) A probe was released which soft landed on Io.
 - C) The spacecraft used a gravity assist from both Venus and Earth.
 - D) Intense magnetic fields were discovered in the asteroid belt.
 - E) The spacecraft crashed into the moon Europa.
4. One of the discoveries made by the Voyager probes at Jupiter was
 - A) that the Great Red Spot is uniform and featureless.
 - B) the absence of a magnetic field around the giant planet.
 - C) Io has a featureless surface that never changes.
 - D) a thin ring of dust around the equator.
 - E) each of the four large moons produces a strong magnetic field.
5. Which three played a role in the finding of Neptune?
 - A) Bode, Herschel, and Fraunhofer
 - B) Newton, Einstein, and Tombaugh
 - C) Shapley, Hubble, and Whipple
 - D) Herschel, Hubble, and Einstein
 - E) Adams, Leverrier, and Galle
6. Small deviations in a planet's orbital motion
 - A) imply the nearby presence of a massive body.
 - B) show the planet's orbit isn't stable.
 - C) indicate the presence of an extensive atmosphere.
 - D) indicate the presence of a powerful magnetic field.
 - E) show we don't fully understand gravitational forces yet.
7. Adams and Leverrier predicted the position of Neptune, based on its perturbations of
 - A) Jupiter.
 - B) the Sun.
 - C) Uranus
 - D) Pluto
 - E) Saturn's rings.
8. Uranus was discovered
 - A) thousands of years ago.
 - B) with a radio telescope.
 - C) after examining perturbations in Neptune's orbit.
 - D) less than 250 years ago.
 - E) by Galileo
9. At which planet can the pole remain in darkness for 42 years, then have 42 years of constant daylight?
 - A) Uranus
 - B) Jupiter
 - C) Saturn
 - D) Neptune
 - E) Pluto
10. In terms of axial tilt, which of the jovians shows us the largest inclination?
 - A) Pluto
 - B) Jupiter
 - C) Uranus
 - D) Saturn
 - E) Neptune
11. If you found a bathtub big enough to hold Saturn, then
 - A) Saturn would sink like a rock, due to its denser core.
 - B) Saturn could float.
 - C) Saturn would explode upon contact with water.
 - D) it would precipitate helium into the tub.
 - E) Saturn would drown, because it does not know how to swim.
12. The planet whose pole was facing the Sun when Voyager 2 approached in 1986 was
 - A) Uranus.
 - B) Saturn.
 - C) Jupiter.
 - D) Pluto.
 - E) Neptune.
13. Jupiter and the other jovian planets are noticeably oblate because
 - A) they are fluid bodies that are spinning rapidly.
 - B) their powerful gravity acts stronger on the closer poles than the distant equator.
 - C) they are tidally distorted by the pulls for their satellite systems.
 - D) they all have strong magnetic fields that deform their shape.
 - E) All of the above are correct.
14. What would Jupiter have needed to be a star?
 - A) a slower spin, similar to the Sun's 25 days, instead of its present 10 hours
 - B) a different chemical composition
 - C) more uranium to ignite nuclear fission chain reactions in its core
 - D) a larger satellite system.
 - E) enough more mass to make the planet hotter.

15. Which of these is true about the seasons of Uranus?
- A) With a tilt of 29 degrees, they are not that different from our solstices and equinoxes.
 - B) At the Uranian pole the Sun sets every 16 hours during the summer and winter.
 - C) Its strange tilt produces extreme seasonal variations, especially at the poles.
 - D) At the Uranian equator, the Sun would pass overhead every sixteen hours.
 - E) There are no seasons at the poles.
16. The reason the jovian planets lost very little of their original atmosphere is due to their
- A) rapid rotation.
 - B) ring systems.
 - C) strong magnetic fields.
 - D) large mass.
 - E) many moons.
17. Compared to Saturn, Jupiter is about
- A) three times more massive and denser.
 - B) half as massive and more dense.
 - C) half as dense, but the same mass since it is larger.
 - D) twice the diameter, but less dense.
 - E) 100 times more massive.
18. Studying the magnetospheres of the jovians has allowed us to measure their
- A) gravity.
 - B) orbital period.
 - C) ring system diameters.
 - D) rotation rates.
 - E) orbital radius.
19. Essentially, the Great Red Spot is
- A) a large cyclonic storm (hurricane).
 - B) Neptune's largest atmospheric feature.
 - C) traveling north and south across Jupiter's face.
 - D) always located within 10 degrees of Jupiter's north pole.
 - E) composed primarily of iron oxide.
20. Alternating zones of rising and sinking gas in Jupiter's atmosphere
- A) circle the planet from pole to pole.
 - B) create light and dark bands.
 - C) cause Jupiter's magnetic field to ripple.
 - D) produced the ring system discovered by Voyager.
 - E) generate their own magnetic fields.
21. The only probe into the atmospheres of any jovian planet was launched by
- A) Galileo into Jupiter's equatorial zone.
 - B) Huygens into Saturn's equatorial belt.
 - C) Pathfinder into Mars' atmosphere.
 - D) Cassini into Saturn's clouds.
 - E) Voyager 2 into Titan's atmosphere.
22. The two outer jovians appear bluish in color because
- A) dust motes in their atmospheres scatter blue well, just as in our own blue sky.
 - B) from their distance, the Sun would appear hotter and bluer than from Earth.
 - C) hydrogen and helium are both blue in large concentrations.
 - D) ammonia absorbs blue light well.
 - E) methane gas in their atmospheres absorbs red light well.
23. Which common gas is less abundant in the top of Saturn's atmosphere, compared to what we observe at Jupiter?
- A) hydrogen
 - B) methane
 - C) helium
 - D) nitrogen
 - E) argon
24. Why does Saturn radiate even more excess heat than Jupiter?
- A) Saturn's thick clouds give it a stronger greenhouse effect.
 - B) Saturn's atmosphere contains much methane, which is very flammable.
 - C) Helium rain falling inward generates heat as it descends.
 - D) Only Saturn is still radiating heat left over from its formation.
 - E) Saturn is more massive than Jupiter, so its gravitational compression is stronger.
25. Which planet had the Great Dark Spot in 1989, but had lost it by 1995?
- A) Jupiter
 - B) Pluto
 - C) Uranus
 - D) Neptune
 - E) Saturn
26. Of the Jovian planets, which generates the least internal heat?
- A) Jupiter
 - B) Neptune
 - C) Uranus
 - D) Pluto
 - E) Saturn
27. The magnetic field tilts of which two bodies are the most unusual?
- A) Saturn and Pluto
 - B) Uranus and Neptune
 - C) Mars and Saturn
 - D) Jupiter and Saturn
 - E) Mercury and Earth

28. What is the source of Jupiter's intense radio waves and magnetism?
- A) liquid metallic hydrogen swirling in the rapidly spinning mantle
 - B) the auroral displays in the polar regions, just like with the earth
 - C) the ionized sulfur ejected into a torus around Jupiter by Io
 - D) charged particles trapped in Jupiter's solid iron core similar to Earth
 - E) a liquid iron and nickel outer core, just like the earth's magnetic field
29. Jupiter gives back into space twice the energy it gets from the distant Sun. Where is this energy coming from, for the most part?
- A) coming from, for the most part?
 - B) the radioactive decay of U-238 in its iron-rich core, just as with the earth
 - C) the slow escape of gravitational energy left from its formation
 - D) the combined tidal stress of all four large Galilean moons
 - E) the impact energy of comets like SL-9
 - F) helium rain descending into its mantle and core
30. What is true of Jupiter's magnetosphere?
- A) It does not trap protons and electrons, as Earth's Van Allen belts do.
 - B) It is most extensive on the sunward side of the planet.
 - C) It has a tail that extends at least to Saturn's orbit.
 - D) Although its surface field is greater, since the planet is larger the total field is actually weaker than Earth's.
 - E) It is only slightly stronger than Saturn's.
31. What is thought to lie at the center of Jupiter?
- A) a hot sea of liquid metallic hydrogen
 - B) a solid core of crystalline helium
 - C) a massive core of rocky materials with some iron mixed in
 - D) a fusion core like the Sun's, with hydrogen being turned into helium
 - E) gaseous hydrogen and helium, for Jupiter is not differentiated like Earth
32. Which two jovians have magnetic field tilts that are not along their rotation poles?
- A) Jupiter and Saturn
 - B) Saturn and Neptune
 - C) Jupiter and Uranus
 - D) Uranus and Neptune
 - E) All jovians have magnetic fields close to their rotational axes.