

# Planetary Astronomy. Quiz Review:

## Jovian planet atmospheres and physical properties.

- The mass of Jupiter is
  - one billionth that of the Sun
  - one millionth that of the Sun
  - one ten-thousandth that of the Sun
  - one thousandth that of the Sun
  - one hundredth that of the Sun
- Galileo's atmospheric probe found this gas to be less abundant than expected, but it is still the second most abundant gas in Jupiter's atmosphere.
  - Oxygen
  - Water vapor
  - laughing gas (nitrous oxide)
  - Hydrogen
  - Helium
- Jupiter can retain light gases like H and He because of its
  - heat of collapse
  - chemical bonds
  - strong magnetic field
  - large surface gravity
  - charming personality
- Jupiter's  $9^h55^m$  rotation period is defined by its strong \_\_\_\_\_ which has about the same period as Jupiter's polar clouds.
  - equatorial cloud decks
  - tropical belt clouds
  - Great Red Spot
  - magnetic field
  - plasma torus
- Although it is not the most dense moon around Jupiter, \_\_\_\_\_ is the largest of the Galilean satellites.
  - Callisto
  - Io
  - Ganymede
  - Europa
  - Adrastea
- The analogue to the Earth's low and high pressure zones are Jupiters' \_\_\_\_\_. These appear as dark and light bands in visual-wavelength photos.
  - belts and zones
  - ovals
  - phosphines
  - troposphere
  - vertical cloud structure
- T or F. Comet S-L 9 flew into Jupiter's atmosphere with a single, big explosion.
- T or F. The Great Dark Spot on Neptune has persisted since its discovery.
- T or F. All Jovian planets appear to demonstrate magnetic fields produced by the dynamo effect.
- T or F. Neptune is more massive than Uranus despite being smaller in size.
- T or F. The interiors of Uranus and Neptune do not have a thick layer of metallic hydrogen like Jupiter and Saturn.

12. T or F. Saturn has more pronounced belts and zones than Jupiter.
13. Saturn is depleted of this element relative to Jupiter because it rains or precipitates out of its lower atmosphere.
- (a) oxygen      (b) water vapor      (c) laughing gas (nitrous oxide)  
(d) hydrogen      e) helium
14. Jupiter can retain light gases like H and He because of its
- (a) heat of collapse      (b) chemical bonds      (c) strong magnetic field  
(d) large surface gravity      (e) radio confluence
15. The infrared radiation emitted by the Jovians comes partly from heating by sunlight, but also largely from \_\_\_\_\_.
- (a) nuclear fusion      (b) chemical bonds      (c) the heat of collapse  
(d) nuclear fission      (e) the dark lord Sauron
16. The object whose position was predicted by two astrophysicists before it was found was \_\_\_\_\_
- (a) Mars      (b) Uranus      (c) Neptune      (d) Jupiter      (e) Saturn
17. Which of these objects has the lowest average density?
- (a) Uranus      (b) Jupiter      (c) Neptune      (d) the Moon      (e) Saturn
18. Saturn's rings are edge-on and vanish when it is at:
- (a) opposition.  
(b) conjunction with the Sun.  
(c) greatest elongation.  
(d) an equinox.  
(e) a solstice.
19. The bluish hues in Neptune and Uranus are attributed to \_\_\_\_\_.
- (a) methane      (b) air      (c) water vapor      (d) ammonia  
(e) ammonium hydrosulfide
20. The mass of Jupiter is most about \_\_\_\_\_ times the Earth's mass.
- (a) 3      (b) 30      (c) 120      (d) 300      (e) 1000
21. The \_\_\_\_\_ of both Uranus and Neptune are highly tilted relative to their rotation axes and significantly offset from the planet's centers.
22. What is the probable cause of the magnetic fields around planets?
- (a) a solid chunk of magnetized iron in the planet's core      (b) a liquid, conductive interior combined with rotation      (c) auroral activity      (d) entrainment of the Sun's magnetic field

23. The substance that gives Jupiter its orangish hues is \_\_\_\_\_.
- (a) helium      (b) ammonia      (c) water      (d) nitrogen  
(e) ammonium hydrosulfide
24. The most abundant element on the Jovian planets is \_\_\_\_\_.
25. "Weather" is nature's way of redistributing and evening out \_\_\_\_\_.
- (a) wind      (b) helium      (c) water      (d) wealth      (e) heat or energy
26. Shoemaker-Levy 9 was a(n) \_\_\_\_\_ that collided with \_\_\_\_\_.
- (a) moonlet, Saturn      (b) comet, Saturn      (c) asteroid, Jupiter  
(d) comet, Titan      (e) comet, Jupiter
27. What is the axial tilt of Saturn?
- (a) like Jupiter, almost zero  
(b) about half of our own, 12.5 degrees  
(c) a little more than ours, 27 degrees  
(d) similar to Neptune's, 43 degrees  
(e) flopped over like Uranus, 95 degrees
28. William Herschel thought he had found a comet when he spotted the green disk of:
- (a) Triton.  
(b) Uranus.  
(c) Neptune.  
(d) Pluto.  
(e) Sedna.
29. The planet whose pole was facing the Sun when visited by Voyager 2 in 1986 was:
- (a) Jupiter.      (b) Saturn.      (c) Uranus.      (d) Neptune.      (e) Pluto.

### **Quiz 7 Review. The Jovian Rings and Moons**

30. Which planet has the most massive and bright ring system? \_\_\_\_\_
31. T or F. The largest gap (division) in the rings of Saturn is caused by an orbital resonance with Mimas.
32. T or F. Titan has a more opaque and thick (deep) atmosphere than Earth.
33. The faint planet whose position was predicted by two astrophysicists before it was found was \_\_\_\_\_
- (a) Saturn      (b) Uranus      (c) Neptune      (d) Mars      (e) Ceres

34. The brightest parts of planetary ring systems are found within the planet's \_\_\_\_\_  
 (a) Roche limit (b) innermost moon's orbit (c) auroras (d) atmospheric haze  
 (e) belts and zones
35. T or F The majority of the Moons in the mnemonic MET DR THIP are tidally interlocked with Saturn.
36. T or F All but the "IP" in the Moons of the mnemonic MET DR THIP have coplanar orbits (within 2 degrees).
37. Which Moon is like a two-toned walnut?  
 (a) Mimas (b) Tethys (c) Ganymede (d) Iapetus (e) belts and zones
38. Which big moon of Saturn has long been the most promising as a home for life? \_\_\_\_\_
39. A good time to find new moons around Saturn is during a \_\_\_\_\_ crossing every  $\sim 15$  years.
40. Which moon of Jupiter is the most promising as a home for life? \_\_\_\_\_
41. Which phenomenon has NOT yet been observed amongst the moons of Saturn?  
 (a) vulcanism supplying ring particles (b) moons residing in Lagrangian points  
 (c) two moon's trading orbits (d) small moons shepherding ring particles  
 (e) medium-size moons colliding periodically
42. Although it is not the most dense moon around Jupiter, \_\_\_\_\_ is the largest of the Galilean satellites.  
 (a) Callisto (b) Io (c) Ganymede (d) Europa (e) Adrastea
43. This moon may have more liquid water than the Earth.  
 (a) Callisto (b) Io (c) Ganymede (d) Europa (e) Adrastea
44. The moon Daphnis was found by Cassini in a feature called the \_\_\_\_\_.  
 (a) Cassini's Division (b) G-ring (c) F-ring (d) Keeler gap (e) D ring
45. The moon with chaotic dynamics was called \_\_\_\_\_.  
 (a) Rhea (b) Hyperion (c) Iapetus (d) Telesto (e) Titan
46. Which Saturnian ring feature appears "braided" or "ropey" and is accompanied by Pandora and Prometheus?  
 (a) Cassini's Division (b) the G-ring (c) the F-ring  
 (d) the E-ring (e) the Encke gap
47. Triton's orbit is unusual because it is backward, or \_\_\_\_\_, and will spiral in toward Neptune.

48. The dark streaks on the moon \_\_\_\_\_ are thought to be caused by Nitrogen geysers.
49. Three rings around Neptune are named after the \_\_\_\_\_ of Neptune.
50. T or F. Neptune has no dynamically regular moons.
51. What does the “P” stand for in MET DR THIP?
52. What does the “H” stand for in MET DR THIP?