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Astronomy Study Guide
Exam 3 Chapters 8-13

Chap 8:

- 1) Which of the following statements best describes the general pattern of composition among the four jovian planets?
 - Jupiter and Saturn have compositions that are fairly different from the compositions of Uranus and Neptune.

- 2) Look at the densities of the jovian planets given in figure 1. Which of the following statements best describes the pattern of jovian planet densities?
 - There is no clear trend in the densities.

- 3) Which of the following statements best explains why the densities of Uranus and Neptune are higher than those of Jupiter and Saturn?
 - They have a higher proportion of hydrogen compounds and rock.

- 4) Which of the following best explains why Jupiter's density is higher than Saturn's?
 - Jupiter is more massive than Saturn

- 5) Based on the leading scientific theory of solar system formation, which of the following statements best explains why Uranus and Neptune have a significantly different composition and higher density than Jupiter and Saturn?
 - Jupiter and Saturn captured more gas from the solar nebula than Uranus and Neptune.

- 6) The following images show Earth and the four jovian planets of our solar system. Rank these planets from left to right based on their distance from the Sun, from closest to farthest. (Not to scale.)
 - **Closest:** Earth Jupiter Saturn Uranus Neptune **Farthest:**

7) The following images show Earth and the four jovian planets of our solar system. Rank these planets from left to right based on their size (average equatorial radius), from smallest to largest. (Not to scale.)

○ **Smallest Radius:**

Earth

Neptune

Uranus

Saturn

Largest Radius:

Jupiter

8) The following images show Earth and the four jovian planets of our solar system. Rank these planets from left to right based on their mass, from lowest to highest. (Not to scale.)

○ **Lowest Mass:**

Earth

Uranus

Neptune

Saturn

Highest Mass:

Jupiter

9) **Jupiter & Saturn only:** Composed mostly of hydrogen and helium.

-Interior is mostly liquid or metallic hydrogen.

Uranus & Neptune only: Composed mostly hydrogen compounds.

-Blue color because of methane.

All four jovian planets: Approximately 10 Earth-mass core.

-Strong atmospheric winds & storms.

-Orbited by rings of ice & rock.

-Magnetic field stronger than Earth's.

No jovian planets: Solid surface under a thick atmosphere.

10) Which lists the jovian planets in order of increasing distance from the sun?

○ Jupiter, Saturn, Uranus, Neptune

11) Why does Neptune appear blue and Jupiter red?

○ Methane in Neptune's atmosphere absorbs red light

- 12) Why is Jupiter denser than Saturn?
- Its higher mass & gravity compress its interior.
- 13) Some jovian planets give off more energy than they receive because of?
- Ongoing contraction or differentiation
- 14) 1. The largest moon in the solar system is **Ganymede**.
2. The jovian moon with the most geologically active surface is **Io**.
3. Strong evidence both from surface features and magnetic field data support the existence of a subsurface ocean on **Europa**.
4. **Tidal heating** is responsible for the tremendous volcanic activity on Io.
5. **Callisto** is the most distant of Jupiters four Galilean moons.
6. The fact that Europa orbits Jupiter twice every one orbit of Ganymede is an example of a (n) **Orbital resonance**.
- 15) The main ingredients of most satellites of the jovian planets are?
- Hydrogen compound ices
- 16) Why is Io more volcanically active than our moon?
- Io has a different internal heat source.
- 17) What is unusual about Triton?
- It orbits its planet backward.
- 18) Which moon shows evidence of rainfall & erosion by some liquid substance?
- Titan