

Answer all questions in the space provided. If you have any questions, raise your hand. 100 points possible. No calculators or electronic devices of any type.

1 (2 pts) The most common type of meteorite to hit the Earth is a

- (a) Carbonaceous Chondrite
- (b) Ordinary Chondrite
- (c) Achondrite
- (d) Stony-Iron
- (e) Iron

2 (2 pts) The most primitive type of meteorite is a

- (a) Carbonaceous Chondrite
- (b) Ordinary Chondrite
- (c) Achondrite
- (d) Stony-Iron
- (e) Iron

3 (2 pts) Which of the following has the greatest effect on the magnetic field of the Earth?

- (a) The composition of the Earth's crust
- (b) The rotation rate of the Earth
- (c) The mass of the Earth
- (d) The Earth-Moon distance

4 (2 pts) Inside the Roche limit of Saturn

- (a) accretion is very efficient because tidal forces are strong
- (b) accretion is very efficient because tidal forces are weak
- (c) accretion is very inefficient because tidal forces are weak
- (d) accretion is very inefficient because tidal forces are strong

5 (2 pts) What is the most common feature of the surfaces of **Dead** worlds.

- (a) Methane-rich lakes
- (b) Tectonic fractures
- (c) Volcanic lava flows
- (d) Crater-saturated

6 (2 pts) Where do most meteorites originate?

- (a) Asteroid Belt
- (b) Kuiper Belt
- (c) Oort Cloud
- (d) Around exoplanets

7 (2 pts) Where do most short-period comets originate?

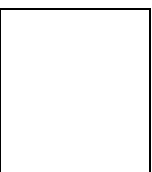
- (a) Asteroid Belt
- (b) Kuiper Belt
- (c) Oort Cloud
- (d) Around exoplanets

8 (2 pts) Where do most long-period comets originate?

- (a) Asteroid Belt
- (b) Kuiper Belt
- (c) Oort Cloud
- (d) Around exoplanets

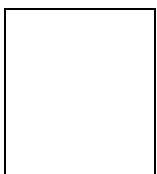
9 (2 pts) Jupiter takes about 12 years to go around the Sun. An asteroid in a **4:1** resonance with Jupiter would take how many years to go around the Sun?

- (a) 3 years
- (b) 4 years
- (c) 12 years
- (d) 48 years



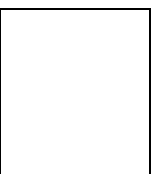
10 (8 pts) Describe the role that Jupiter played in the extinction of the dinosaurs.

11 (8 pts) Describe the role Jupiter played in the formation of the Earth's oceans.



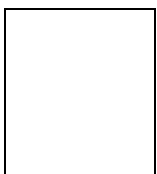
12 (6 pts) Recent data suggests that a satellite of Saturn may have a moment-of-inertia of 0.55. Explain why this is **very** unusual.

13 (10 pts) Explain why resonances are critical for the tidal heating of Jupiter's satellite Io.



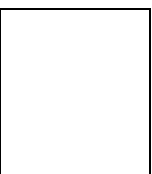
14 (6 pts) Explain how you can detect exoplanets using the *Transit* method.

15 (10 pts) Explain why you **cannot** form Jupiter at 1 AU from the Sun.



16 (8 pts) Explain why the parent bodies of primitive objects are always small.

17 (10 pts) Describe how the most common type of meteorite that falls on the Earth is different from the most common sample collected on the Lunar mare.



18 (6 pts) Describe how sunlight changes the atmosphere of Saturn's satellite Titan.

19 (10 pts) In the space below, sketch the reflectance spectra of Titan's atmosphere (visible light only).

