ASTRONOMY 150 – FINAL Name: _____

June 7, 2006 – Spring 2006 TA's Name & Section: _____

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

1 (2 pts) How do we know some asteroids have differentiated?

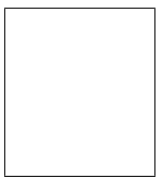
(a) We have observed that most asteroids are very small.
(b) We have iron meteorites.
(c) We have detected a magnetic field around some asteroids.
(d) We have observed that no asteroids spin faster than about 2 hours.
(e) We have carbonaceous chondrite meteorites.

2 (15 pts) Explain what is/was the heat source for **most** solid worlds in our solar system and why geological activity scales with size.

3 (2 pts) Which of the following would you have to change about Venus for it to have a magnetic field today?

(a) Level of geological activity.
(b) Rotation rate.
(c) Composition of the core.
(d) Distance from the Sun.
(e) Composition of the atmosphere.

4 (15 pts) Describe how **secondary atmospheres** are formed and explain why their composition is different in the inner solar system as compared to the outer solar system.



5 (2 pts) What does it mean for an asteroid to be in a 3:1 resonance with Jupiter?

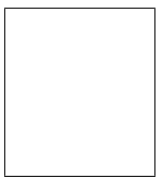
(a) The asteroid orbits Jupiter 3 times for every time Jupiter rotates once.
(b) The asteroid orbits the Sun 3 times for every time Jupiter orbits once.
(c) The asteroid is 1/3 the size of Jupiter.
(d) The asteroid is 3 times closer to the Sun than Jupiter.
(e) The asteroid rotates 3 times for every time Jupiter rotates once.

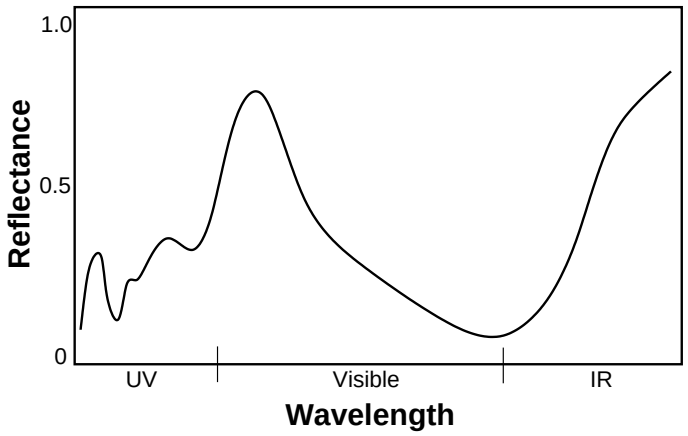
6 (15 pts) Trace the path of a **short-period** comet from birth to death.

7 (2 pts) Inside a planet's Roche limit:

(a) Ice is too weak to form large objects.
(b) Tidal forces are greater than gravitation forces.
(c) Gravity from the planet is too weak to pull objects into spheres.
(d) Tidal heating melts large moons.
(e) The magnetic field tidally disrupts large moons.

8 (15 pts) Explain why Jupiter grew so very massive while the Earth did not.





9 (2 pts) The plot on the left shows the reflectance spectra of a rock. To your eyes this rock would look:

(a) dark grey
(b) bright blue
(c) dark red
(d) bright red
(e) dark blue

10 (15 pts) Explain why there is a bias towards detecting large extra-solar planets close to their central star.

11 (1 pts) Water is **more / less** (circle one) volitale than rock

12 (12 pts) Describe **three** ways our solar system would be different if Jupiter had a mass of only 1 Earth-mass.

13 (2 pts) List the top 100 object in the solar system.