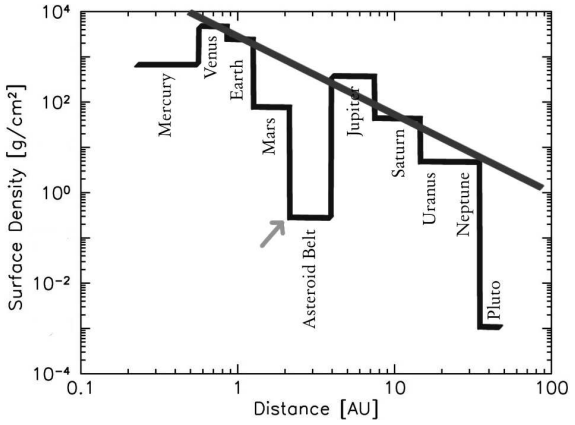
ASTRONOMY 150 – FINAL Name: _____

June 11, 2007 – Spring 2008 TA Name & Section: _____

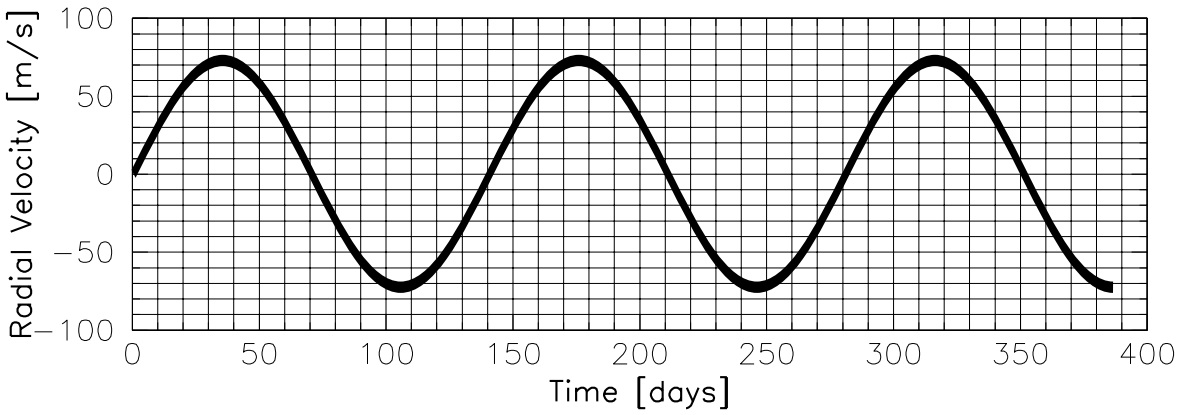
Answer all questions in the space provided. If you have any questions, raise your hand. 100 points possible. NO CALCULATORS OR ANY ELECTRONIC DEVICES.

1 (8 pts) The amount of material at the orbit of Mars and the Asteroid Belt is much less that you would expect (see plot on right). Explain why this is.



2 (8 pts) Explain why the individual particles that make-up the rings of Saturn are **not** spherical in shape.

The plot below shows the radial velocity observations of a solar-type star. The table on the right shows the relationship between the Amplitude [Amp] of the radial velocity and the Mass of the unseen planet.



Amp (m/s)	Mass (M_{Jup})
0	0.0
50	1.2
100	2.4
150	3.7

3 (4 pts) What is the period of the planet? _____ [days]

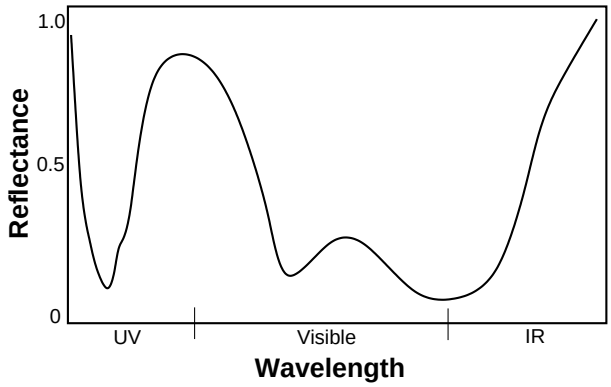
4 (5 pts) What is the mass of the planet? [Use the table]. _____ [M_{Jup}]

5 (5 pts) Is this planets closer or farther than 1 AU from the central star? Explain your reasoning.

6 (6 pts) Explain how the visual appearance of Jupiter would be different if it rotated in 20 hours, rather than 10 hours.

7 (8 pts) A R-Plot of the craters on the surface of a world tell us nothing about the age of the surface. What does a R-Plot tell us about a surface?

8 (8 pts) Explain why we can **not** use crater counting to determine the absolute age of the surfaces of the moons of Saturn.



9 (3 pts) The plot on the left shows the reflectance spectra of a sample. To your eyes this sample would look:

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

10 (3 pts) Compared to the average composition of the solar system, worlds that have been heated have:

(a) fewer refractory elements.
(b) a higher moment-of-inertia factor
(c) fewer volatile elements.
(d) a lower density
(e) more angular momentum

11 (6 pts) Later this Summer (Aug 12th), the Earth's atmosphere will be bombarded by particles from the Perseids meteor shower. Explain why they always hit the Earth in Mid-August.

12 (5 pts) Rocks from the Moon are very old. Explain why they are not *primitive*.

13 (3 pts) Which of the following would **most** affect the level of geolocially activity on Jupiter's moon Io?

(a) Move the Jupiter system twice a far from the Sun.
(b) Turn off the magnetic field of Jupiter.
(c) Slow down Jupiter's rotation.
(d) Remove Europa from orbit around Jupiter.
(e) Double the mass of the Asteroid Belt.

14 (3 pts) A satellite in a 2:1 resonance with the Earth's Moon would take approximately how many days to orbit the Earth? Assume the satellite is closer than the Moon.

(a) 0.5 days
(b) 7 days
(c) 14 days
(d) 30 days
(e) 183 days

15 (8 pts) Explain why there was so much more **solid** planet building material at a distance of 5 AU from the Sun as there was at 1 AU.

Not all of the worlds we have seen so far have been completely covered by impact craters. For each of the worlds below describe the physical process(es) that destroy impact craters.

16 (5 pts) Earth

17 (5 pts) Io

18 (5 pts) Triton (moon of Neptune)

19 (2 pts) And finally, list the top 100 objects in the solar system.