

**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 (4 pts) What type of meteorite is most likely to be found on the surface of an asteroid that has **never** been heated?

2 (4 pts) Jupiter takes about 12 years to go around the Sun. How long would it take for an asteroid in a 2:1 resonance with Jupiter to go around the Sun?

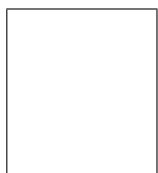
3 (8 pts) Explain why there may not have been life on Earth if it rotated on its axis at the same rate as Venus (1 rotation = 243 days).



4 (4 pts) What type of meteorite is most likely to be found in the core of a very small (< 100 m) asteroid?

5 (4 pts) Describe why the tidal force of Jupiter distorts the shape of Io.

6 (8 pts) Explain why there is a close relationship between the composition of a world's surface and the composition of its atmosphere.



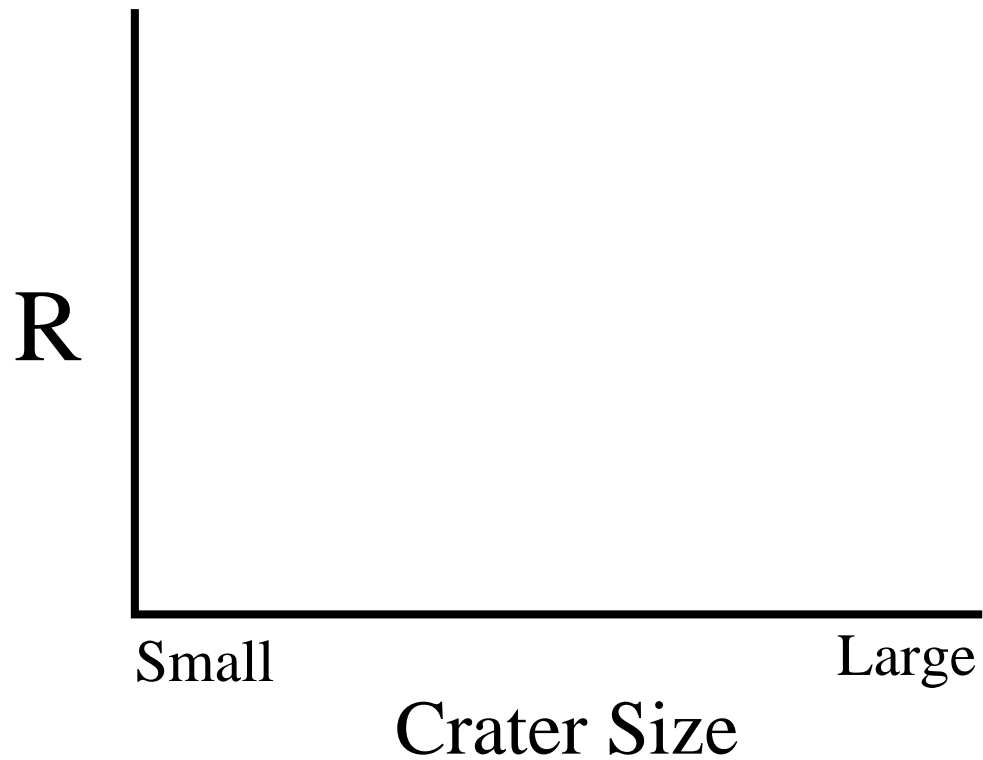
7 (4 pts) What type of meteorite is most likely to be found on the surface of an asteroid that was volcanically active?

8 (4 pts) Describe how the visual appearance of the clouds Jupiter would change if you were to slow down Jupiter's rotation rate.

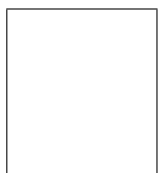
9 (8 pts) Explain why there is so much more material at 5 AU to build Jupiter than there is at 1 AU where the Earth formed.



10 (8 pts) On the axes below, sketch and label an **R-Plot** for **A** - a typical dead world in the **outer** solar system, **B** - a typical dead world in the **inner** solar system.



11 (8 pts) Explain why the differences in the two R-Plots you plotted above means that we can not use crater counts to determine the age of surface in the outer solar system.

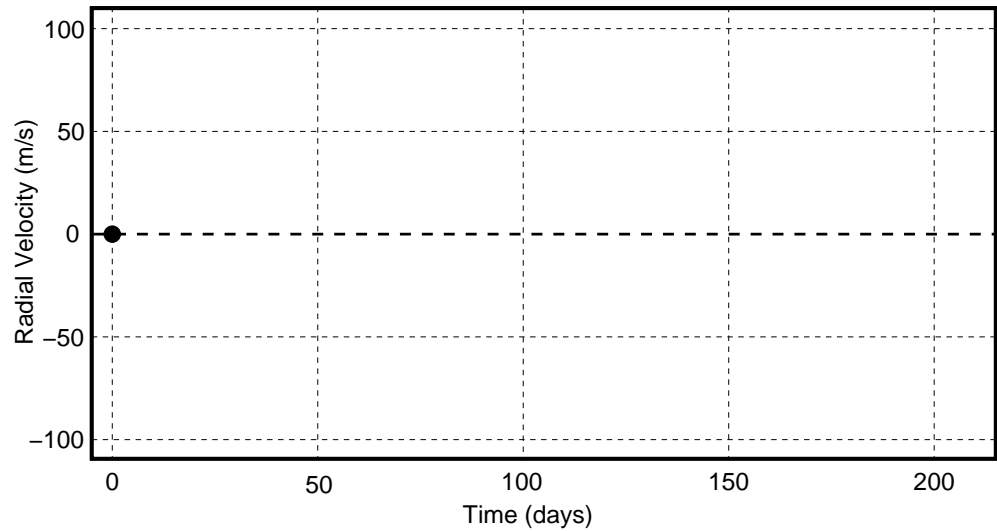


12 (4 pts) What type of *material* is most likely to be found on the surface of a very small (< 1 km) **Kuiper Belt Object**?

The table on the right shows the radial velocity observational data for two stars, just like our Sun, with planets orbiting them

Planet	Period [Days]	Maximum Radial Velocity [m/s]
A	50	100
B	100	25

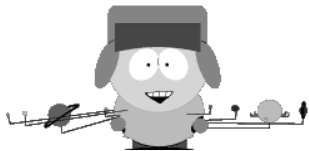
13 (8 pts) On the graph below, draw how the radial velocity of each of the two stars would change over 200 days of observations (label each line). Assume that the stars have a radial velocity = 0 m/s on Day 0.



14 (8 pts) Explain which of the two planets would be the easier to detect.



15 (10 pts) I said that kuiper belt objects were dark and red. In the space below sketch and label the reflectance spectra of a kuiper belt object and a white piece of notebook paper. You should have one plot with two spectra plotted.



16 (6 pts) I have said many times that “the Sun is the top 99 objects in the Solar system.” Obviously, the Sun is only one object. Explain what I meant by this statement.

