Astronomy 150B - Midterm

Name: _____

February 7, 2002

TA's Name & Section (2 pts): _____

Answer all questions in the space provided. If you have any questions, raise your hand. 100 points possible.

0 (3 pts) Iron has a density of _____ g/cm^3, rocks have a density of about _____ g/cm^3, and water has a density of _____ g/cm^3.

The chart below shows the properties of four planets orbiting a star that is identical to our Sun. Use these data to answer the questions on the next two pages.

Planet	Mass [Earth = 1]	Diameter [Earth = 1]	Uncompressed Density [g/cm^3]	Moment of Inertia Factor [K]	Average Distance from Star [AU]
Leonore	1/8	1/2	5.0	0.38	0.4
Violetta	1/10	1/2	4.0	0.40	0.8
Tatyana	6	2	3.8	0.30	1.0
Isolde	1/2	1	2.5	0.36	2.0

1 (6 pts) How long does it take the planet Isolde to orbit the star? [Show your work]

- ◯ Less than 1 year
- ◯ Between 1 and 2 years
- ◯ Between 2 and 3 years
- ◯ Between 4 and 5 years
- ◯ Greater than 5 years

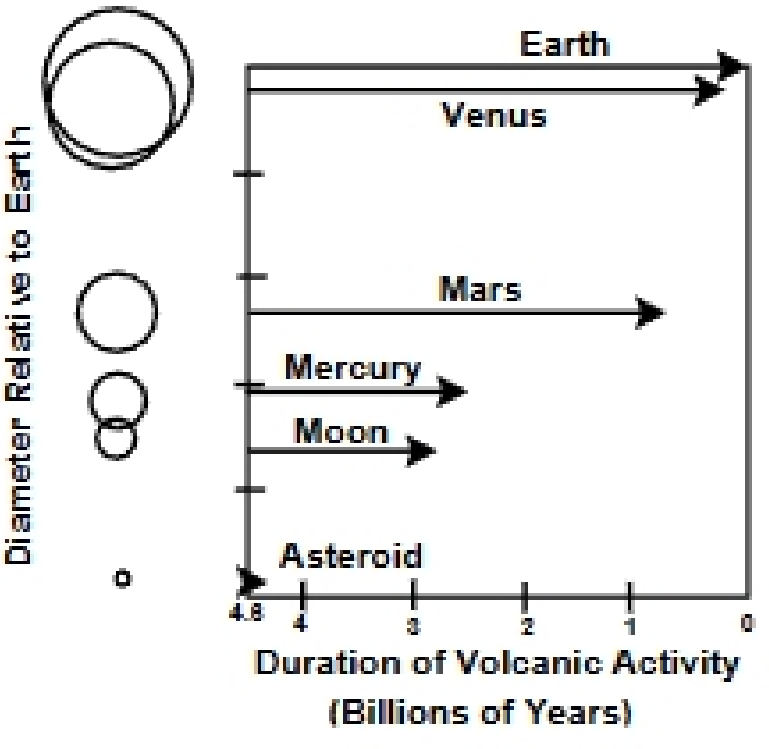
2 (5 pts) If we assume that these planets are made of the same materials as our solar system (ice, rock, and iron) what is the most likely composition of the planet Tatyana ?

3 (8 pts) How does the gravity on LEONORE compare to the gravity on the ISOLDE? [Show your work.]

4 (5 pts) Which of the planets is the **most** differentiated? [Explain your answer.]

5 (6 pts) Explain why we can not use crater counting to determine the absloute age of the surface of VIOLETTA.

We have seen this plot a lot in class. It shows that larger worlds are geologically active for longer periods of time than smaller worlds.



6 (8 pts) Explain why larger worlds are geologically active for longer periods of time than smaller worlds.

7 (3 pts) A few of the meteorites collected on the Earth are 1-billion-year-old pieces of basalt. According to the graph above, which worlds are possible sources for these meteorites?

8 (5 pts) Which of these worlds is the most likely source and why?