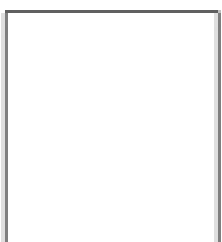


**Answer all questions in the space provided. If you have any questions, raise your hand. 100 points possible. No calculators.**

**0 (3 pts)** Water has a density of \_\_\_\_\_  $g/cm^3$ , rocks have a density of about \_\_\_\_\_  $g/cm^3$ , and Iron has a density of about \_\_\_\_\_  $g/cm^3$ .

**1 (6 pts)** We have seen basalt on the surface of the Moon, Mars and Venus. Assume that you can collect samples of the basalts from the three worlds. Explain how and why the ages of three samples would differ.

**2 (6 pts)** All of the Apollo missions explored simple impact craters. Explain how simple impact craters are used to sample the deep layers of the Moon.



The table below shows the properties of three planets orbiting a star that is identical to our Sun. Assume these planets are made of the same materials as the planets in our solar system. Use these data to answer the questions on this page.

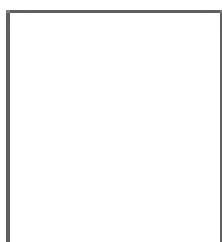
Planet	Mass [Earth = 1]	Radius [Earth = 1]	Uncompressed Density [ $g/cm^3$ ]	Moment-of-Inertia Factor [K]
OLGA	1/6	2/3	3.2	0.40
MASHA	?	1/2	4.0	0.35
IRINA	2	?	5.0	0.30

**3** (5 pts) What is the most likely composition of the planet OLGA?

**4** (5 pts) If the gravity on MASHA is the same as the Earth's, what is the mass of the planet? [show your work]

**5** (5 pts) If the gravity on IRINA is the twice that of the Earth, what is the size of the planet? [show your work]

**6** (5 pts) Which one of these worlds would have the most Iron in its outer crust? [Be sure to explain your answer]



**7 (4 pts)** Currently, the planet Mercury has no atmosphere. However, when it was geologically active, it released gasses. What gasses would have been released?

**8 (6 pts)** Explain why Mercury did not hold on to its atmosphere even though its escape velocity is nearly the same as Mars'.

**9 (4 pts)** Explain why Mercury is not geologically active today.

