

Astronomy 150 - Exam #1

Name: _____

October 25, 1996

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

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

1 (5 pts) You have discovered an airless planet orbiting between the Sun and Mercury. You measure its uncompressed density to be $\rho = 6 \text{ gm/cm}^3$ and its albedo to be $A = 0.12$. Describe the approximate composition of this planet.

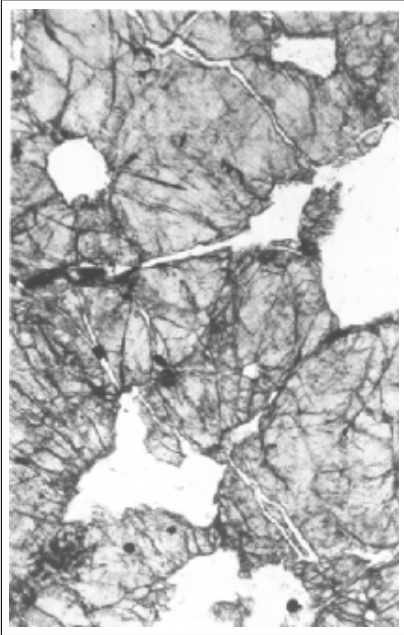
2 (10 pts) A region on Mercury has 100 impact craters per square kilometer. A region on Venus has 50 impact craters per square kilometer. How do the **relative** ages of these two surfaces compare?

3 (5 pts) If you wanted to find the **absolute** ages of these two surfaces how would you do that?

4 (5 pts) If you were to triple the size of the Earth (increase its radius by a factor of three) **and** triple the mass of the Earth, how much would it change the gravity on the Earth (how much would your weight change)? [show your work]

6 (3 pts) What is the property of CO_2 and H_2O that makes them greenhouse gases?
[Because they cause the greenhouse effect is not a good answer.]

7 (10 pts) Explain how the greenhouse effect works. Use the Earth's atmosphere as an example.



8 (4 pts) This is an image of a thin-section of a Lunar rock we saw in class. If this were a color image you would notice that the material appears grey to slightly yellow. What type of rock is this? (check one)

- ☐ Mare Basalt
- ☐ Impact Breccia
- ☐ Lunar Regolith
- ☐ Plutonic Rock
- ☐ Orange Soil

9 (4 pts) What are the characteristics of the thin-section that you used to answer the above question?

10 (4 pts) How was the rock that this thin-section came from formed?

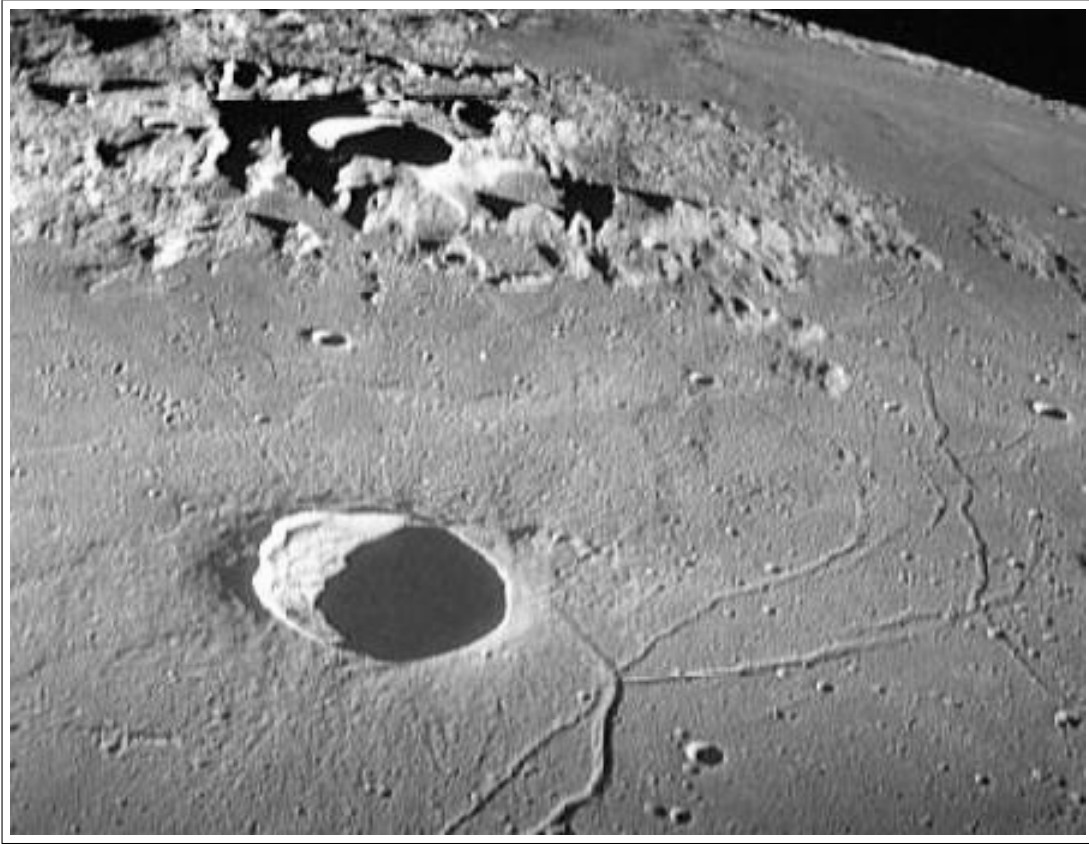
11 (4 pts) Where on the Moon would you expect to find this rock?

12 (4 pts) Why would you expect to find this rock there?

13 (3 pts) Explain what it means for a planetary surface to have saturation cratering.

14 (10 pts) Choose one theory of the origin of the Moon other than the Giant Impact theory (i.e. Co-Accretion, Capture, or Fission) and describe two properties of the Moon or Earth–Moon system that this theory does a **good** job of explaining.

15 (7 pts) Why can't liquid water exist on the surface of Mars today? Describe two surface features that indicate that water ice exists in the subsurface of Mars.



16 (20 pts) This image shows a portion of the Moon near the Apollo 14 landing site. Write a paragraph or two describing the surface features you see (use your planetary vocabulary) and their **relative** ages. If you can not determine the relative ages of some of the features explain why you can not. Feel free to draw a simple geological map to make your points clear (use the back of this page if necessary).