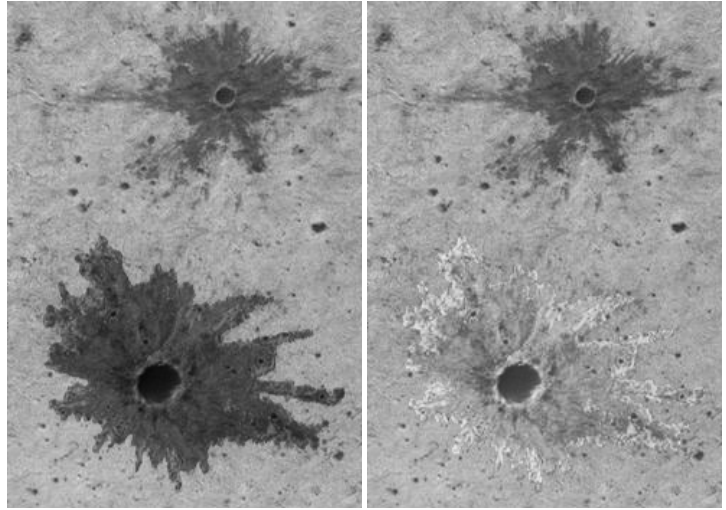
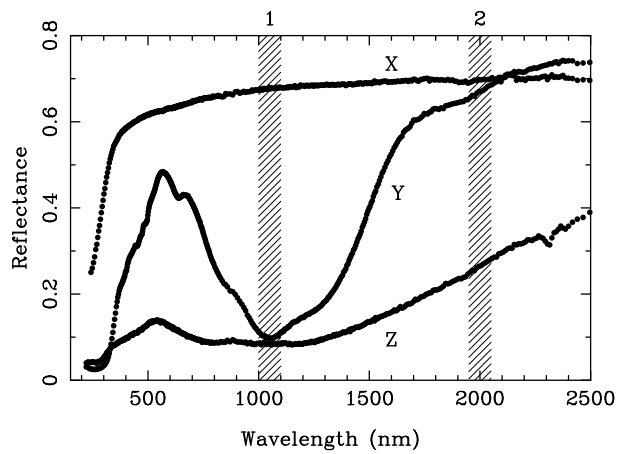


**Answer all questions in the space provided. If you have any questions, raise your hand.
100 points possible. *** No Calculators *****

1 (5 pts) Describe the energy source that drives (drove) the geological activity on the Earth, Venus, Mars, Mercury and the Moon?

2 (6 pts) Explain why it is difficult to detect Earth-sized planets around other stars. (Be more specific than “The Earth is very small”.)

3 (6 pts) Explain why large moons do not form within the *Roche Limit* of the giant planets.



FILTER 1

FILTER 2

On the left is a plot of the reflectance spectra of three different rock types (X, Y, AND Z) and the bandpasses of two different filters: FILTER 1 and FILTER 2 (cross-hatched regions). On the right are two images of a planetary surface. The first image is taken through FILTER 1, and the second through FILTER 2. Use this data to answer the next five questions.

4 (6 pts) Name the geological features shown in this image and describe how they were formed.

5 (9 pts) Describe the distribution of the three different rock types X, Y, AND Z in the region imaged.

6 (6 pts) Human eyes are sensitive to light of wavelengths between 400 nm (Blue) and 800 nm (Red). Describe how each of the three different rock samples X, Y, AND Z would look to astronauts picking up the samples. Make sure you comment on the sample's color and relative brightness.

7 (6 pts) What rock type would you expect to find deepest under the surface? Explain.

8 (4 pts) How would you determine the absolute age of this planetary surface?

On the following two pages are a series of facts that we learned about the solar system this quarter. For each of the facts, list **what data** we used to determine the fact [2pts] and **how this data was used** to determine the fact [5pts]. The data may be a sample, an image, a comparison with another world, or a theoretical model. *Make sure that you are **specific** about what sample, image, world, theory you are using.*

9 (7 pts) *Fact #1:* Some asteroids are not differentiated.

Data used:

10 (7 pts) *Fact #2:* The solar system is 4.5 billion years old.

Data used:

11 (7 pts) *Fact #3:* The surface of Saturn's moon Rhea is 3.8 billion years old.

Data used:

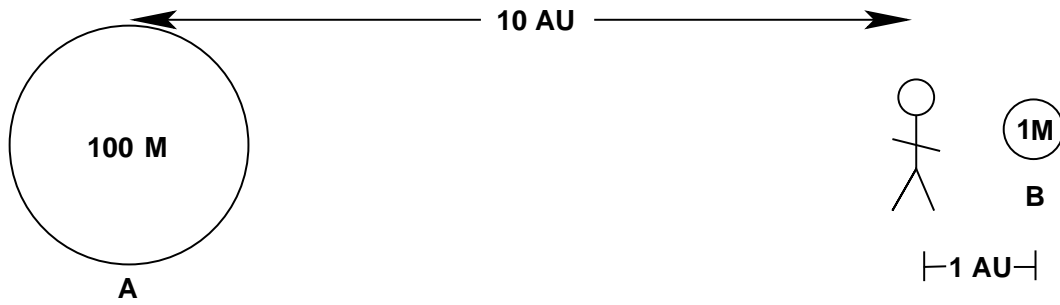
12 (7 pts) *Fact #4:* Iron meteorites came from the cores of a large body (i.e. an asteroid)

Data used:

13 (7 pts) *Fact #5:* Most meteorites come from the asteroid belt.

Data used:

In the middle of reading this question you are suddenly transported to a point in space 10 AU from a 100 M_{\oplus} planet (A) and 1 AU from a 1 M_{\oplus} planet (B). Before you lose consciousness in the vacuum of empty space answer the next two questions.



14 (7 pts) Which planet has a greater gravitational pull on you? [show your work]

15 (7 pts) Which planet has a greater tidal force on you? [show your work]

Returning to the room, just before losing consciousness, you see the last question:

16 (3 pts) List the top 100 objects in the Solar System.