

Astronomy 150 - Exam #2

Name: _____

November 21, 1997

TA's Name & Section: _____

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

1 (5 pts) Venus has a thicker atmosphere than the Earth and yet has more impact craters recognized on its surface than the Earth. Explain why.

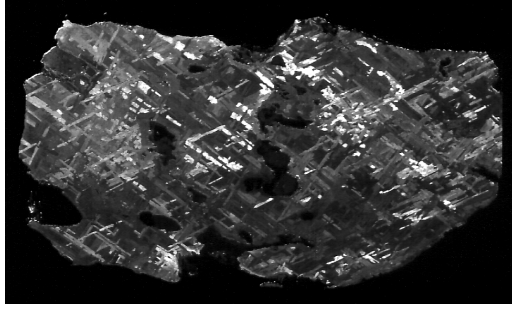
2 (6 pts) The Mir Space Station orbits well within the Roche limit of the Earth and yet it is not pulled apart by tidal forces. Explain why this is so.

3 (5 pts) How does the gross composition of worlds inside the Asteroid belt differ from those outside it?

4 (2 pts) What atmospheric gas is most responsible for the greenhouse effect on Earth?

5 (10 pts) Explain how the greenhouse effect works. Use the Earth's atmosphere as an example.

6 (5 pts) Describe what would happen to the Earth's atmosphere if you moved Earth to the same orbit as Mars.

A**B**

Above are images of the cut and etched sections of two different Iron meteorites showing their Widmanstätten patterns. (Both meteorites are about the same size). Assume that both of these meteorites came from the same relative position within two different-sized asteroids. Use these images to answer the next three questions.

7 (10 pts) Explain why the existence of the Widmanstätten patterns means these meteorites came from the cores of a large body (i.e. an asteroid).

8 (1 pts) Which meteorite came from the larger asteroid? ☐ **A** ☐ **B**

9 (5 pts) Explain why you answered the above question as you did.

10 (3 pts) What is the dominate geological process on “Dead Worlds” like Callisto?

11 (10 pts) Io, Europa, and Enceladus are geologically active today due to tidal heating. Describe how tidal heating works.

12 (5 pts) Why is the Earth’s Moon not geologically active today due to tidal heating by the Earth.

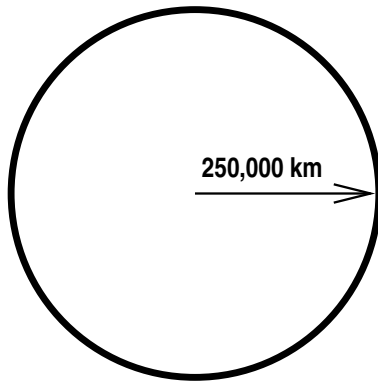
13 (10 pts) Explain how we know the asteroid belt is not the remains of a single planet that exploded.

14 (4 pts) Why are old large craters on Ganymede and Callisto much shallower and more subdued than those found on the Earth's Moon?

15 (4 pts) Arrange the four Jovian Galilean satellites in order of geological activity from (1) most active to (4) least active.

- _____ Io
- _____ Europa
- _____ Ganymede
- _____ Callisto

16 (5 pts) The Kirkwood gaps of the asteroid belt are not physical gaps in space like the gaps in the rings of Saturn. What does the "gap" in the Kirkwood gaps refer to?



Long range sensors have imaged a planet in a nearby star system. You can only see the **outer** edge of the planet's ring system; the planet itself is too dark to see. You measured the size of the ring system to be 250,000 km in radius (see diagram on left). Use this information to answer the next two questions.

17 (3 pts) What is the **minimum** radius that the planet can have?

- ☐ 250,000 km
- ☐ 100,000 km
- ☐ 50,000 km
- ☐ 10,000 km
- ☐ 1,000 km

18 (7 pts) Explain how you determined what the minimum radius would be.