

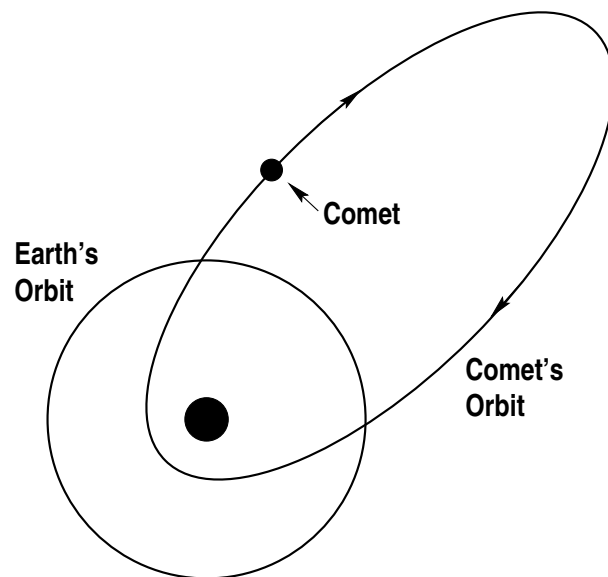
Answer all questions in the space provided. Please write in complete sentences. If you have any questions raise your hand. 80 points possible.

1 (6 pts) The surfaces of Venus and the Earth have very few small impact craters compared to the Moon. Explain why this is (there are two reasons).

2 (4 pts) This is a diagram of a comet in orbit around the Sun. Indicate on the diagram the position of the gas and dust tails of the comet.

3 (4 pts) Indicate on the diagram the location in Earth's orbit where meteor showers would occur.

4 (4 pts) Is this comet in a prograde or retrograde orbit?



5 (3 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?

6 (6 pts) What are two pieces of evidence that show that most meteorites came from the asteroid belt?

7 (6 pts) Explain how we know that iron meteorites came from the cores of a large body (i.e. an asteroid).

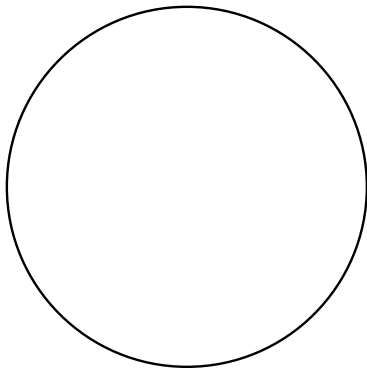
8 (8 pts) Explain why the existence of carbonaceous chondrite meteorites means that the asteroid belt can not be the result of a single planet that has exploded.

9 (5 pts) Long range scanners have detected a planetary system around the star Wolf 359. Sensors were able to determine the density and albedo of 5 of the solid **airless** worlds but not their distance from the star. Arrange the planets in order of increasing distance from Wolf 359. Please consider both the density **and** albedo when making your decision. (1 - closest, 5 - farthest).

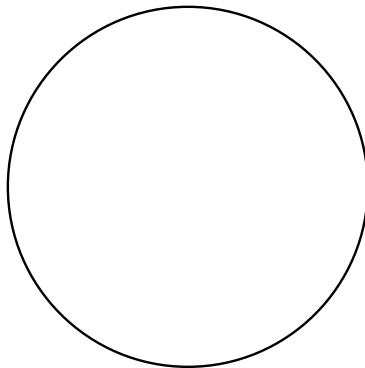
_____	Planet A	$\rho = 2.1 \text{ g/cm}^3$	Albedo = 0.70
_____	Planet B	$\rho = 6.0 \text{ g/cm}^3$	Albedo = 0.10
_____	Planet C	$\rho = 5.2 \text{ g/cm}^3$	Albedo = 0.20
_____	Planet D	$\rho = 3.4 \text{ g/cm}^3$	Albedo = 0.25
_____	Planet E	$\rho = 1.3 \text{ g/cm}^3$	Albedo = 0.05

10 (6 pts) Explain why you ordered the planets the way you did.

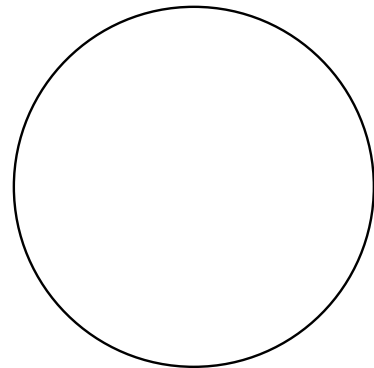
11 (9 pts) Assume that the planets above have fully differentiated and are composed only of iron, rocks and ice (they do **NOT** have to contain all three). Based on your data from Question 9, draw what the interiors of planets A, B, and D would look like. Your drawing should reflect the relative sizes and compositions of the interior zones



Planet A



Planet B



Planet D

12 (3 pts) In lecture I said that the “Snow Line” occurs at about the position of the asteroid belt in our solar system. What is the “Snow Line”?

13 (6 pts) How does the gross composition of worlds inside the “Snow Line” differ from those outside it?

14 (6 pts) Describe how the appearance of the Earth’s moon (as seen in the sky from the Earth) would change if it had the same physical properties (size, albedo, etc) of Jupiter’s moon Ganymede?

15 (4 pts) Describe one similarity and one difference between the surfaces of the Earth’s Moon and Jupiter’s moon Callisto.