

Astronomy 150 - Exam #3

Name: _____

December 12, 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) The Kuiper Belt was originally theorized as a reservoir of material for short-period comets. Explain why short-period comets need to be replenished.

2 (5 pts) How do Kuiper Belt Objects become short-period comets (Why do they not stay in the Kuiper Belt)?

3 (6 pts) Pluto and Triton are the largest examples of Kuiper belt objects. Explain how they are able to remain in the Kuiper belt for 4.5 billion years.

4 (10 pts) Point out as least two factual errors in the quote below and explain why they are errors.

“Mars is in essentially the same orbit [as the Earth]. Mars is somewhat the same distance from the Sun, which is very important. We have seen pictures where there are canals, we believe, and water. If there is water, that means there is oxygen. If oxygen, that means we can breath”.

— *Vice President Dan Quayle, serving as head of the National Space Council. Interview on CNN, week of October 8, 1989*

5 (5 pts) The Earth’s Moon and Saturn’s moon Titan are about the same size and have about the same gravity. Titan has a thick atmosphere while the Moon has none. Why doesn’t the Moon have an atmosphere?

6 (6 pts) Match the world with its **main** internal heat source. Place the letter of the heat source in the space next to the world. You can use a heat source for more than one answer.

- | | |
|-------------|--------------------------|
| ___ Earth | |
| ___ Neptune | A. Planetary Contraction |
| ___ Europa | B. Tidal Heating |
| ___ Io | C. Radioactive Heating |
| ___ Jupiter | D. Thermonuclear Fusion |
| ___ Venus | |

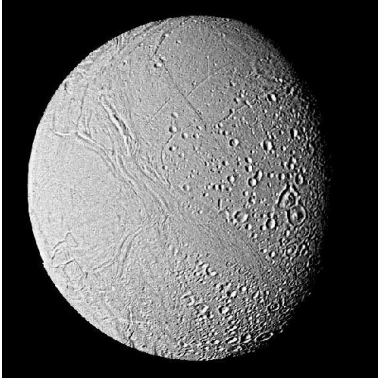
7 (6 pts) Uranus' atmosphere appears **featureless** and **monochromatic** as compared to Jupiter's atmosphere. Explain why this is so. [two parts to the answer]

8 (5 pts) Astronomers have recently discovered a Jupiter-sized planet orbiting at a distance of 0.1 AU from the solar-type star 55 Cancer. **If** this planet is a gas giant explain why it is unlikely that it formed at its present location.

9 (5 pts) There are at least a million asteroids in the asteroid belt. Explain why the Galileo probe survived its trip through the asteroid belt undamaged.

10 (6 pts) Jupiter's very large mass means that it has a large influence in our Solar system. Describe two ways that Jupiter has influenced other worlds or regions in our Solar system.

11 (10 pts) Explain why Jupiter was able to grow so large.



12 (5 pts) On the left is an image of Saturn's moon Enceladus taken by the Voyager spacecraft. In class I said that the surface of Enceladus is younger than the surface of the Earth's Moon. How did I determine that based solely on the image?

13 (5 pts) Explain one reason why my assumption about the age of the surface of Enceladus may be completely incorrect.

14 (6 pts) Explain how we know the Solar system is about 4.5 billion years old?

15 (5 pts) List the top 100 objects in the solar system

16 (10 pts) I am sure that there is a question that you really studied for but does not appear on this exam. Write out this question and answer it.

Make sure that your question is relevant to Astronomy 150, the level is appropriate (your question should be worth 10 pts), it is not a restatement of a question already asked (on this exam or a previous one this quarter), and that you ANSWER IT CORRECTLY!