**ELT HOMEWORK**

**Chapter 6. Prospects for Life: Mars**

1. Explain the following statement—Mars may be experiencing today the geologic conditions that the Earth will experience several billion years from now.

   This statement means that several billion years from now, Earth will also be geologically dead. This is due to the planet losing its internal heat to space overtime. Over several billion years volcanism will cause the heat and gasses to escape into the atmosphere and the distance to the surface of the planet is short and the heat will be lost.

2. How does the size of Mars compare with the sizes of the Moon and the Earth?

   Mars is twice the size of the Moon and half the size of the Earth. It is 10 times the mass of the Moon and $1/10^{th}$ the mass of the Earth.

3. What are the present surface conditions on Mars (e.g., climate, density and composition of the atmosphere, presence or absence of liquid water or ice, etc.)?

   The present surface conditions of Mars include a very thin layer (a thousandth of an inch thick) of water in the atmosphere. There are very dry conditions with almost no clouds. Mars also has seasons similar to Earth seasons.

4. What is the evidence that Mars once had abundant liquid water?

   There are large channels that resemble channels on Earth that were cut by water during floods in desert regions. Additionally, there are channels that represent riverbeds.

5. When was Mars' "golden age"?

   Mars' "golden age" was approximately 3.5 to 4 billion years ago.

6. What were the results of the Viking landers' search for life in the Martian soil?

The results of the Viking landers' search for life in the Martian soil were that there were only chemical reactions, not biological ones. The soil released both oxygen and carbon dioxide which indicated plant and microbial life respectively, however, it was consistent with a chemical reaction.

7. What would be the significance of finding even microbial life on Mars?

The significance of finding even microbial life on Mars is that we would have definitive proof that life exists on more than one planet in our Solar System. This could help us to determine the probability of life in the Universe. Life on two planets tells us that the conditions were not an accident and that it can happen elsewhere.

**Chapter 7. Venus Our Sister Planet**

1. What are the surface conditions on Venus today?

The surface of Venus is 500 million years. The conditions are that it has large craters from meteorite impacts. There are volcanic plains and even mountains.

2. Why are the temperatures so high in the Venus atmosphere?

The temperatures are so high in the Venus atmosphere because Venus is closer to the Sun than the Earth is. It receives 1.9 times the intensity of the sunlight that reaches the Earth. The Greenhouse Effect keeps this heat trapped inside the planet which raises its temperature because the atmosphere of Venus is comprised of 96% Carbon Dioxide.

3. What is the Greenhouse effect?

The Greenhouse Effect is when heat is trapped inside of the planet due to the amount of water vapor, carbon dioxide, and ozone in the atmosphere. They absorb the heat and warm the interior. This is called the Greenhouse effect because is can be compared to the way a greenhouse is see through (such as

the atmosphere) but the glass traps the heat from the plants inside of it.

4. Explain the term "habitable planet".

"Habitable planet" refers to a planet that can support life such as the Earth can. Factors that determine this include, distance from the Sun, size of the terrestrial planet, and composition of the atmosphere. The planet needs to be just close enough to the Sun to be warm but not too hot or too cold. The planet has to be the right size to retain its own heat. The atmosphere needs to be able to protect the planet and provide the correct quantities of gasses to support life.