

Astronomy 305: Life in the Universe
Homework 8: Chapter 8

Total points: 40

1. (8 pts) [a] What would it be like to walk on Mars today? Briefly discuss the conditions you would experience. Give temperatures, pressures, gravity; what would it feel like? [b] Would you need a space suit or oxygen tank to survive? Why?
2. (10 pts) Summarize the evidence suggesting that Mars must have been warm and wet, possibly with rainfall, in its distant past.
3. (10 pts) [a] What is the leading hypothesis concerning how Mars lost its once-thick atmosphere? [b] What role does Mars's size play in this hypothesis?
4. (2 pts) On Mars, the feature Olympus Mons is
 - (a) a giant volcano;
 - (b) a huge canyon network;
 - (c) a continent-size plateau.
5. (2 pts) We can recognize the oldest surface regions of Mars by the fact that they have
 - (a) the most impact craters;
 - (b) the most volcanoes;
 - (c) the most evidence of past water flows.
6. (2 pts) Rivers on Mars
 - (a) have never existed;
 - (b) existed in the past but are dry today;
 - (c) continue to have flowing water today.
7. (2 pts) Which must be true if Mars was warmer and wetter in the past?
 - (a) Mars was once closer to the Sun.
 - (b) Mars once had a much thicker atmosphere.
 - (c) Mars must somehow have avoided the effects of the heavy bombardment.
8. (2 pts) Which of the following fundamental properties of Mars could explain why it once had a global magnetic field but later lost it?
 - (a) its small size;
 - (b) its larger distance than Earth from the Sun;
 - (c) a rotation rate that is slightly slower than Earth's.
9. (2 pts) Under the leading scenario, if Mars once had much more carbon dioxide in its atmosphere, most of this carbon dioxide is now
 - (a) gone, because it was lost to space;
 - (b) frozen at the polar caps;
 - (c) locked up in the form of carbonate rocks, just like on Earth.