

ASTR 2310 General Astronomy I – Spring 2020, Brotherton

Homework #5, due in class Tuesday, March 24, 2020

Instructions: Homework write-ups should be clean and clear. Illegible or hard to understand solutions may not earn credit. In addition to the solution, the steps leading to the solution are also important to earn full credit. You may need to use information from the internet to solve some of the problems, and you should clearly state your sources if you do so. Use appropriate units and significant figures for your solutions (or uncertainties if requested). It is permissible to work in groups, but everyone must hand in their own solutions that they have written themselves.

1. Sightseeing in the solar system

Based on classroom lecture, discussion, labs, the textbook, the online sights, or other reading, what **three** things in the solar system would you find most interesting to visit in person? When reasonable to do so, provide quantitative details (e.g., how high, how fast, etc.) in your answer.

2. Planetary surface temperatures

What factors affect the surface temperature of a planet? What factors affect the uniformity of the surface temperature of a planet? Provide enough details that show you've thought about these issues and the size of their relative effects. Writing down one or more equations and discussing the individual terms is one way to approach this question.

3. By Neptune's light.

On average, what is the percentage of light per square meter received at Neptune's moon Triton compared to that received on Earth? (Don't worry about atmospheric effects.) What would be the expected surface temperature in Kelvin? State any assumptions you might make to calculate this. What wavelength would Triton emit at most effectively? Give your answers to two significant figures and use information from Dobson's table 4.1 or similar resource (please cite if the latter).

4. Explain briefly

- a) why smooth surfaces are likely to be younger than heavily cratered ones
- b) why objects near the Sun are less likely to have atmospheres than those farther out
- c) why small objects are less likely to have atmospheres than larger ones
- d) the difference between refractory and volatile
- e) what albedo means
- f) what the ecliptic is
- g) the distinction between major and dwarf planets