

Name: \_\_\_\_\_

Section: \_\_\_\_\_

**Homework 4: Astronomical Instruments, Solar System Survey**

**Due:** In your section the week of **February 18<sup>th</sup>**. Be neat and concise, show your work, and remember units. An answer without the correct units is wrong.

**Readings:** Ch 6,7,9.1, and lectures 8,9 and 10.

1. [4 points]

(a) What is the diffraction limit (in arcseconds) of a telescope of aperture 2 meters at 500 nm observations?

(b) It turns out that under normal conditions, this telescope has the effective angular resolution of  $0.1''$ . Is this the same as your number in part (a)? Explain why or why not.

(c) How can you improve the angular resolution of this telescope?

(d) What is the maximum angular resolution this telescope can have? Under ideal conditions, should this telescope be able to resolve 2 stars separated by  $0.1''$ ? Explain why this is different from your answer in part (b).

2. [2 points] Draw simple diagrams and label the key parts of the following telescopes.

(a) Refracting telescope

(b) Reflecting telescope (Pick one type of reflecting telescope and specify)

3. [3 points] List three advantages that telescopes have over naked eyes.

4. [3 points]

(a) Which of the 8 planets in our solar systems are terrestrial planets? Which are jovian planets?

(b) List four differences between inner and outer planets.

(c) Are Jupiter's Galilean moons more similar to terrestrial or jovian planets? Explain.

5. [2 points] How are the *relative ages* and *absolute ages* of planetary surfaces obtained?

6. [2 points] If no radioactive elements were present when the Earth formed, how would the present core temperature of the Earth be affected? Explain.

7. [4 points] You discover a new terrestrial planet in another star system with *NO* craters. What does this mean? Explain. (There could be more than one answer.)