

**Sample exam 3 (Chapters 13 through 18)**

*Open book, exercises, notes; no collaboration. You have 50 minutes.*

1. Write one sentence stating a **factual error** in the poster you are fixing.

2. Match the appropriate coordinate system for the situation shown:

Altitude/azimuth

Letting someone in Boston know where an astronomical object is in the sky

Latitude/longitude

Letting your neighbor know where an astronomical object is in the sky

RA/Dec

Letting someone in Boston know where you are

3. **Order** the following from oldest event (1) to most recent event (4):

A. Chondrules

B. Planets

C. Planetesimals

D. Solar nebula

4. Which of the following phenomena are directly related to the 2<sup>nd</sup> law of thermodynamics?

a. The motion of lithospheric (crustal) material on Earth

b. The generation of trans-iron (bigger than iron) atoms during a supernova

c. The tendency for some nebula to dissipate (spread out and get thinner)

d. The eventual uniform temperature of the entire universe

5. a. Name one piece of evidence that water once flowed on the Martian surface.

b. Name one piece of evidence

6. True or false:

a. When the planets are in conjunction (that is, lined up on the same side of the Sun), strong tidal effects can be expected on Earth.

b. Discussing what space the Big Bang expanded into is meaningless.

7. Match the appropriate time on the left with the action on the right

|                       |  |
|-----------------------|--|
| Eight minutes         | Magnetic field of Sun to reorient itself           |
| Twenty-five days      | Travel time of a photon from Sun's core to Earth   |
| Eleven years          | Travel time of a neutrino from Sun's core to Earth |
| About a million years | Rotational period of Sun's equator                 |

8. Match the asteroid type on the left with the appropriate characteristic on the right

|                  |                                |
|------------------|--------------------------------|
| C-type asteroid  | "Earth-crosser"                |
| Apollo asteroid  | Relatively high albedo         |
| Centaur asteroid | Rock/ice mixture               |
| S-type asteroid  | Most common compositional type |

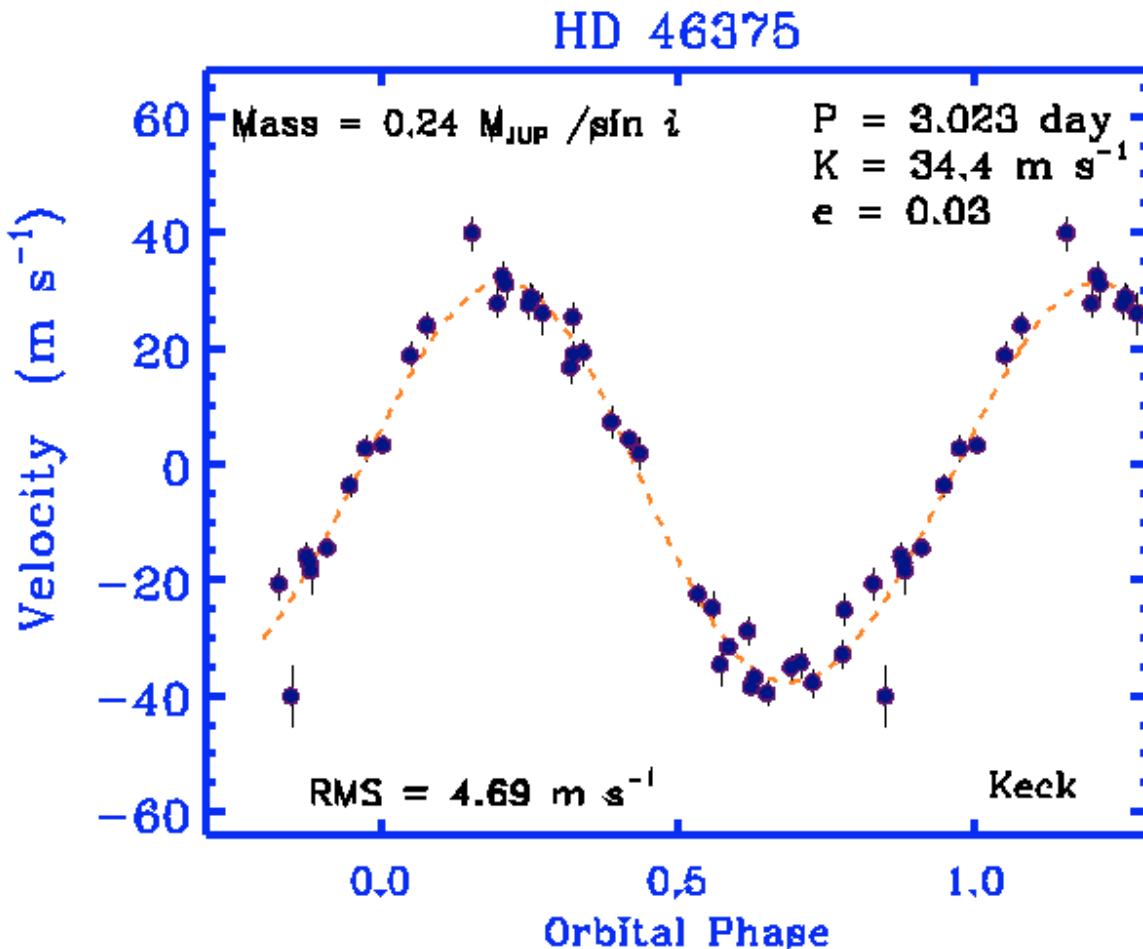
9. What planet(s) is (are) naked-eye visible this evening at 7 p.m.?

Essay questions — please answer each question in sentence/paragraph format or a drawing, depending on what is asked.

10. Draw a view of the solar system from the NCP, showing the Sun, Jupiter's orbit and a short-period comet at perihelion. Also draw the orbit of the comet, using Jupiter's orbit for scale. The comet should show all of the following, if they are applicable: a dust tail, an ion tail, a coma, and a nucleus. Note that the tails, if they exist at this point, should be pointing correctly.

11. What evidence do we have for plate tectonics **not** occurring on Mars? Why would Mars **not** be expected to have plate tectonics (in other words, what characteristic of Mars leads to its lack of plate tectonics)? What evidence do we have for plate tectonics occurring on Venus? Discuss whether the evidence shows that plate tectonics on Venus is similar to plate tectonics on Earth.

12. What is the graph below trying to describe? You can start by first describing what the x-axis and the y-axis represent, and then work your way to describing the significance of the shape of the curve. In your answer, please incorporate the “Mass” and “P” numbers. Hint: HD 46375 is the name of a star.



13. In a comparison of the atmospheres of Venus, Earth and Mars (weekly assignment 7), you should have discovered the following:

|             | Venusian atmosphere | Earth atmosphere | Martian atmosphere |
|-------------|---------------------|------------------|--------------------|
| Pressure    | 90 times Earth's    | 1 times Earth's  | 0.01 times Earth's |
| Composition | Carbon dioxide      | Nitrogen, oxygen | Carbon dioxide     |

Explain **one** of the following:

- The pressure difference between the three worlds
- The atmospheric compositional difference between the three worlds