

Astronomy 161 – Introduction to the Solar System
Autumn Quarter 2006
Homework #5

Due Wednesday, November 29 in class

Instructions:

Answer the 5 questions on the bubble sheet provided with the handout. This handout is just a worksheet: we will only accept homework on bubble sheets available in class during the week.

On the bubble sheet, please fill in the following info:

1. Your full name, **last name first**, first name last, and **remember to bubble in the letters!**
2. Use only a black **Number 2 Pencil**, no pens or other markers, please.

Your answers are due in class on **Wednesday, November 29**. No late homework will be accepted.

This homework assignment consists of the 5 questions below. Each question has equal weight.

1. The Floras are a family of asteroids with orbital semi-major axes of ~ 2.3 AU that are trapped in a 7:2 orbital resonance with Jupiter. This means that a Flora asteroid will complete _____ orbits in the same time that it takes Jupiter to complete _____ orbits.
 - a) 7, 2
 - b) 2, 7
 - c) 7, 1
 - d) 1, 2

2. "Twotinos" are a class of trans-Neptunian objects trapped in a 2:1 orbital resonance with Neptune. Neptune's orbit has a period of ~ 165 years and a semi-major axis of ~ 30 AU. What is the size of the orbital semi-major axis of the Twotinos (to the nearest AU)?
 - a) 15 AU
 - b) 48 AU
 - c) 24 AU
 - d) 60 AU

Hint: you need to use the simple form of Kepler's 3rd Law for the Solar System from Lecture 15 (The Watershed – Tycho Brahe & Johannes Kepler).

3. Some of the rings of Saturn and Uranus are very narrow. Such narrow rings are not expected to persist for very long, and so their existence requires
 - a) extra gravity from large ice/rock cores in the planets.
 - b) continuous replacement of ice by captured comets.
 - c) gravitational confinement by "shepherd moons".
 - d) sculpting by strong magnetic fields.

(turn over)

4. Which of the following is not an actual, official name for an asteroid?
- a) 44016 Jimmypage
 - b) 5945 Roachapproach
 - c) 115058 Woodyhayes
 - d) 4442 Garcia
 - e) 25924 Douglasadams

Hint: Search for the list of "Minor Planet Names" in Google or a similar search engine.

5. Which irregularly-shaped Solar System object is depicted in the photograph below?
- a) Hyperion
 - b) The nucleus of Comet Tempel 1
 - c) Asteroid Itokawa
 - d) 2006 EL61



Hint: The photo above is too recent to be in your textbook, but all of the objects have been in the news during the last couple of years, so a web search for recent images of these objects should turn up something like what you see above.