Astronomy 2310
Instructor: Professor Michael Brotherton
Exam 3 – practice questions
Tuesday, April 4, 10 AM

This exam covers chapters 9-12 of Ryden and Peterson's text Foundations of Astrophysics. Calculators are allowed. The appendices of the text providing various constants and values required for the exam are given on the final pages. Please write all answers clearly and use good English. Box final answers when calculations are required. Use units when appropriate. Show your work. Draw pictures when helpful. Write your name on every page in case pages become separated! Note that there are three parts this time!

Part 1
Short Answers (Do 6 out of 7, 8 points each for 48%)

1.Explain the most likely origin of the moon.
2.Order the planets in size (radius) and in compressed densities, distinguishing between the terrestrial and Jovian planets.
3.Explain qualitatively the radiation processes that remove dust from the solar system.
4.Explain the internal structure of terrestrial planets (in general terms) and why it seems to exist.
5.Describe at least two methods used to detect exoplanets, being quantitative about the quality of the measurements necessary to find them.
6. Which planets have the strongest magnetic fields? What conditions are needed to generate planetary magnetic fields?
7. Tell me what is your favorite planet and why. (I'm looking for about 4 interesting things about your planet to justify the answer.)

Go on to part 2 on the next page!

Part 2

Calculational problems (4 questions, 12 points each, for 48% of the exam)

1. If the scale height for a gas is 5 kilometers, at what altitude does it have 10% of its sea level pressure?
2. What is the central pressure of Jupiter? Please state any assumptions you make.
3. A comet is observed to have a period of 80 years. What part of the solar system does it come from? Quantitatively justify your answer.
4. A sunlike star is seen to dim by 0.05% every 5 days. From this information alone, what can you infer about the presumed exoplanet responsible? Be quantitative. You can assume the star has properties equal to those of the sun, and the system is edge on.

Part 3 (4 points). Final poll about the course. Can do this part in advance if you like, or at the final.

1.Was the math level too low, too high, or just right?
2.Did the course have the right mix of slides, work on the board, and videos or other resources? What parts were best, worst, and how should I change the mix next time I teach this course?
3.Do you have any comments about the textbook?
4.Did the class move too fast, too slow, or just right?
5.Did you benefit from lab? What were your favorite labs? Your least favorite?
6.How about discussion section?
7.Any other comments for Jessie?
8.Any other comments for Mike?

Mathematical things you should still retain from previous chapters or memorize from the current chapters: Newton's version of Kepler's third law. Newton's law of gravitation, F=ma, circular acceleration, momentum (linear and angular), parallax and parsecs, various basic geometric formulas, Wien's Law, Steffan-Boltzmann Law, equation of hydrostatic equilibrium (it's important!), how half-life and scale height works,

CLASS PARTY: Thursday, April 6, 7:30pm, 1161 Apache Drive (Mike's House – 399-9524). There will be pizza and a telescope, Nova on the "Pluto Files" and/or other science fiction shows, etc. Hope you can all make it!