Astronomy 110-1

PROBLEM SET #3 (15 Pts) ___________________________ Name
24 February, 2012 ___________________________ ID #
DUE Friday, 2 March, 2012

1. Match the following with their appropriate “average density” (1 pt):
   A. Ices     B. Rocks     C. Metals

   8 grams/cm³ _______ 1 grams/cm³ _______ 3 grams/cm³ _______

2. Which object has the smallest fraction of its interior in a metal core ? (0.5 pt)
   A. Earth    B. Mercury    C. Venus    D. Mars

3. The most abundant element found in the inner core of the Earth is (0.5 pt) ___________

4. For the Earth, Venus, and Mars list the primary atmospheric gas(es) (meaning any molecule accounting for more than 10% of the total mass of the atmosphere), and the total atmospheric pressure (in units of bars) for each planet (3 pts)

   Primary atmospheric gases (>10% of total)          Total atm pressure (bars)
   Earth       ___________      ___________                ___________
   Venus       ___________      ___________                ___________
   Mars        ___________      ___________                ___________

5. The Asteroid Belt is located between the orbits of (1 pt)

   ___________________________ and ___________________________

6. What is most responsible for producing the Earth's magnetic field (0.5 pt) ?
   A. sunspots
   B. a rotating outer core of liquid metal
   C. bombardment of the Earth by asteroids
   D. the solar wind

7. If the Earth early on had a reducing atmosphere, circle the following molecules that would likely be most abundant (circle all correct answers) (1 pts)

   O₂     O₃     NH₃     CH₄
8. Which below would contribute to an *increasing* “greenhouse effect” on Earth (0.5 pt)?
   A. cutting down the Amazon rain forest
   B. massive volcanic eruptions
   C. release of CO\textsubscript{2} from surface rocks
   D. all of the above

9. Rank (largest to smallest) the 4 giant outer planets according to the following intrinsic properties: (2 pts)
   \begin{array}{cccc}
   \text{Diameter} & \text{Mass} & \text{Density} \\
   \hline
   \text{largest} & \text{smallest} & \text{largest} & \text{smallest} \\
   \end{array}

10. Match the moons of Jupiter with the given property: (2 pts)
    A = Io      B = Callisto      C = Ganymede      D = Europa
    \begin{enumerate}
    \item heavily cratered, icy body; diameter comparable to Mercury
    \item rocky interior, icy covered surface
    \item largest moon in the solar system
    \item surface riddled with active volcanoes
    \end{enumerate}

11. Why do we say there are virtually no seasons on the planet Jupiter? (0.5 pt)
    A. the thick cloud layers uniformly absorb solar energy
    B. the axis of rotation is tilted by only three degrees
    C. Jupiter maintains a constant distance from the Sun
    D. since Jupiter is so far from the Sun, winter lasts all year long

12. The ring particles in the rings of Saturn are composed mainly of (0.5 pt)
    A. pure water ice
    B. ice-coated dust and rock
    C. methane gas
    D. ammonia gas

13. What feature separates the B and A rings of Saturn? (0.5 pt)

14. The density of Saturn is \_\_\_\_\_\_\_\_ the density of water. (0.5 pt)
    A = less than   B = greater than   C = equal to