Exam 2 Review

Earth

Interior zones: solid core, liquid core, lower mantle, upper mantle, crust. P and S waves. Compositions of core (iron/nickel), mantle (basalts) and crust (silicates like quartz and feldspars). Differentiation. Lithosphere and plate tectonics, sea floor spreading, continental drift, subduction zones, bouyant continents vs. dense seafloors, convection in the mantle.

The Moon

Orbital period = spin period. Two kinds of terrain, highlands and maria. Cratering record reveals age difference between them. Surface covered by regolith. Maria are basaltic material from mantle that fill large impact basins. Highlands comprised of less dense minerals. Differentiation. KREEP and the age of the lunar crust. Lunar interior and relative sizes of crust, mantle and core. How did the Moon form? How did Apollo samples change our ideas of this?

Mars

Mars is covered with wind-blown dust. The rocks seen by landers are a mixture of volcanic or impact in origin. Two surface terrains, highlands and plains. Highlands are older, with more craters. Plains appear to be either volcanic flows, or else created by huge floods of liquid water. Many craters show signs of wind and/or water erosion. Very large shield volanoes, especially in the Tharsis bulge region, as well as fractured crust creating canyons like Vallis Marineris. Flood channels and valley networks provide evidence for once abundant water on the surface. Polar regions contain ice caps that grow and recede with the seasons.

Gas Giant Planets:

Interiors of the giant planets (internal zones, chemical composition, shapes). Determination of the internal conditions using chemistry physics. Sources of heat for the interiors, especially Kelvin-Helmholtz contraction (but others also). Formation scenario for the gas giant planets. Differences between big planets like Jupiter and Saturn, and the smaller ones like Uranus and Neptune.

Gas Giant Planets:

Observations of their upper atmospheres. Chemical composition of atmospheres, and the clouds and vertical structures. Strong winds and zonal bands on Jupiter, Saturn and Neptune. The relationship between these winds and the giant, long lived storms that appear in the atmospheres of the gas giants.

Comets:

Long period comets, short period comets. Oort cloud – its location, distance, occupants, theory of origin. Kuiper Belt – its location, distance, theory of origin. Kuiper Belt objects/TNOs. Observational evidence for Kuiper Belts. Components that make up comets (nucleus, coma, tail). What each of these components is made of. Comet origins