

Astronomy 161 - Autumn 2007
In-Class Quiz 3 Study Guide

Light (Electromagnetic Radiation)

Wavelength & Frequency
Speed of Light in a vacuum
Photons
Energy of photons (relation to frequency)
The Electromagnetic Spectrum
Types of light sorted by energy (or equivalently, frequency & wavelength)
Gamma Rays, X-Rays, UV, Visible, IR, Microwaves, Radio
Distinction between apparent brightness & luminosity
The Inverse-Square Law of Brightness
Doppler Effect

Nature of Matter

Constituents of Atoms:
Nucleus of Protons & Neutrons
Orbiting Electrons
Chemical Elements
Atomic Number (number of protons)
Isotopes
Radioactive Decay and Half-Life

Four Fundamental Forces of Nature

Gravitation
Electromagnetism
Strong & Weak Nuclear Forces
Relative strengths of the 4 fundamental forces

Spectroscopy

Kirchoff's Three Laws of Spectroscopy
Continuous Spectrum (Blackbody Spectrum)
Stefan-Boltzmann Law
Wien's Law
Atomic Structure revealed by spectral lines
Emission-line Spectra
Absorption-line Spectra
Excitation and De-Excitation

Telescopes

Refracting Telescopes (design, size limits)
Reflecting Telescopes (design, types)
Light-Gathering Power (importance, dependence on objective diameter)
Properties of good Observatory Sites

Age of the Earth

Historical versus Physical Ages
Radioactive half-life
Radioactive Isotope Dating (radiochronology)
The age of a rock is the time since it solidified
Problems finding the oldest rocks
What is the age of the Earth? What data are used?

Internal Structure of the Earth

Seismology as a probe of the Earth's interior
P- and S-waves
Location and composition of the different layers:

Solid Inner Core
Molten Outer Core
Mantle
Crust
Differentiation
Earth's Magnetic Field
Division of the crust into plates
Plate Tectonics & Continental Drift
Types of plate boundaries
Transform Boundaries (lateral motions, transverse faults)
Convergent Boundaries (plates colliding, subduction, crust buckling)
Divergent Boundaries (mid-ocean ridges)

The Earth's Atmosphere

Composition of the present atmosphere
Primordial (ancient) atmosphere
Origin of the atmosphere in volcanic outgassing
Origin of oxygen in the atmosphere
Where is the water and carbon dioxide now?
Greenhouse Effect (causes & manifestation, importance
in determining the Earth's surface temperature)
Atmosphere evolution
Human impacts on the atmosphere

The Moon

Lunar Terrain types: The Highlands & Maria
Impact Craters
Ages of the different terrains from amount of cratering
Regolith
Absence of a Magnetic Field
Interior structure (crust, mantle, iron core?)
Formation Theories (Co-formation/Fission/Capture/Collision)