GLY1000
Exam #01 Study Guide

Chapter 05:

Geology

1. Physical- examines the materials composing earth and seeks to understand the processes beneath its surfaces
2. Historical- study the origin of earth and the development of the planet

- Earth is 4.6 billion years old

Scientific Method

- Hypothesis is an untested explanation
- Theory a tested and viable hypothesis that has received much review

Hydrosphere- a dynamic mass of water that is always on the move (evaporation, condensation, tides, etc.)

Atmosphere- life-giving gaseous envelope surrounding the earth

Biosphere- all life on earth

Geosphere- solid earth beneath the ocean and atmosphere

1. Crust- thin rocky outermost skin of earth
2. Mantle- 82 % of earth's volume, solid rocky shell

- Lithosphere- crust and thick hard layer of rock that is present until the upper mantle
- Asthenosphere- name of the mantle layer (upper and lower)

3. Core- iron-nickel alloy composition, contributes to earth's magnetic field, split into liquid outer core and solid inner core

Continental drift- the idea that the continents move about the face of the planet, and explanation for the supercontinent's (Pangaea) deformation

Plate tectonics- theory that emerged from the concept of continental drift, claimed earth's outer shell is broken into numerous slabs called lithospheric plates

Boundaries

1. Convergent- when one plate plunges under the other and descends into the mantle, formation of major mountain belts
2. Divergent- located where plates are pulling apart from one another, occurs at oceanic ridges, creation of new seafloor
3. Transform- located where plates slide past each other, movement of such nature usually results in earthquakes.

Continental margin- the portion of seafloor adjacent to land masses

Continental shelf- the sloping platform material extending seaward from shore

Continental slope- steep seafloor extending down into the deep ocean basins

Chapter 11:

Rift valley- a deep down-faulted structure forming on the axis of ridge segments, evidence that tensional forces are actively pulling the ocean crust apart

Continental rift- the elongated depression at divergent boundaries

Subduction zones- convergent boundaries, sites where lithosphere is descending into the mantle

- deep ocean trenches form at the site of subduction
- partial melting also occurs as the plate plunges downward the heat and pressure at roughly 100 km drives the water out of the crust leading to some melting
- continental volcanic arcs (volcanic mountain ranges) will form as the partial melting creates volcanic activity that rises to earth's crust

Ocean-Ocean Convergence- very similar to ocean-continental convergence

- trench forms
- volcanic island arc forms

Continental- Continental- large new mountain ranges form

Transform boundaries- connected with shallow earthquakes and seafloor fraction zones (prominent linear breaks in ocean floor)

Mantle plume- a cylindrically shaped upwelling of hot rock

Hot spot- an area of volcanism, high heat flow, and crustal uplifting

- as a plate moves over a hot spot, a chain of volcanic structures known as a hot spot track forms

Due to the magnetic alignment of iron-rich minerals in lava and their flow at the earth's core...

1. Polar wandering- movement of the poles relative to continental drift
2. Magnetic reversal- periodic shift of polarity

Convection (warm material rising and cold material settling) within the Mantle serves as the mechanism for plate movements...

1. Slab pull- subducting slab sinks because it is colder and denser and mantle material
2. Mantle drag- enhances plate motion when velocity of mantle rises
3. Ridge Push- gravity driven force amplified by the elevated position of the ridges

- It has been suggested that mantle convection happens at two layers, upper and lower mantle

Chapter 06:

Mineral- any naturally occurring inorganic solid that has an orderly crystalline structure and a distinct chemical formula

Basic Chemistry

- Atom contains a nucleus made of protons and neutrons

- Atom has an electron shell with valence electrons on the very outer edge that react with other atoms
- Isotope is the same elemental atom with a different number of neutrons, affects the total mass number
- Ions are +/- charged atoms, opposites come together to form ionic bonds
- Covalent bond is formed by the sharing of a pair of electrons
- Octet Rule claims that atoms will gain or lose electrons until their valence shell contains eight electrons

Physical properties of minerals...

1. Luster- appearance/quality of light reflected from the surface
2. Translucence- ability to allow light to pass through
3. Color
4. Crystal shape
5. Streak- the color of the mineral in powder form
6. Tenacity- a mineral's resistance to breaking or deforming
7. Hardness- a measure of the mineral's resistance to abrasion or scratching
    a. Moh's scale- 10 minerals arranged on a scale of hardness from 1 – 10, diamond being the hardest
8. Cleavage- the tendency for a mineral to break along planes of weak bonding
9. Fracture- the type of breaking that occurs under pressure (smooth, irregular, etc.)
10. Density (specific gravity)- mass per unit of volume

Mineral groups

- Only 8 elements make up the majority of rock forming minerals and 98% of earth's crust (O, Si, Al, Fe, Ca, Na, K, Mg)

1. Silicate Group
    a. Feldspars- 50 % or earth's crust, most abundant
    b. Quartz- made almost completely out of silicon and oxygen, second most
2. Non-Silicate Group-notably includes native elements (gold, silver, copper, diamond)

Ore/Ore deposit- is a naturally occurring concentration of one or more metallic minerals

Chapter 07:

Study in detail The Rock Cycle on page 166 of textbook

Igneous rock- forms as magma cools and crystallizes

Magma- molten rock generated by partial melting of rocks at earth's mantle

- When magma becomes less dense than the surrounding rocks, it buoyantly rises, when it reaches the surface it is then considered lava
- Crystallization at the surface creates extrusive (volcanic) igneous rock while crystallization below the surface is considered intrusive (plutonic)