## EOSC105 Natural Disasters\_F20 / Study Guide for Quiz 1 and Exam 1

**POPULATION AND NATURAL DISASTERS *only exam***

* Why does population growth and urbanization lead to an increase in “Natural Disasters”?
* Vulnerability of population to natural disasters depends on several factors. What are some factors?
* World population has doubled since \_\_\_\_\_\_ (decade, not year)?
* Why are weather related disasters increasing when compared to geological related disasters?
* Understand reason for decadal trends associated with natural disasters (why trends increase or decrease):

 1) population affected 2) economic impact 3) deaths.

**Origin of the Earth *only exam***

1. Be familiar with these terms and they connect (could you use these terms to explain how the solar system formed):
2. supernova;
3. nebular theory:
4. Nebula:
5. Outgassing:
6. Differentiation:
7. Kuiper Belt:
8. Oort Cloud:
9. Asteroids and comets:
10. Where did they come from? 4.6 billion?
11. What and where is the Asteroid Belt? What are Earth-crossing asteroids?
12. Know the difference between asteroids and comets: composition and where they are found
13. What is a meteor? meteorite? Tunguska--what happened and where?
14. Shoemaker-Levy 9 (what and where?) "Meteor Crater"-- where is this located? Recent compared to age of Earth?
15. Early Earth’s atmosphere and oceans--how did they form?
16. What is the age of Earth? Age of oldest continental rocks? why is there a difference between Earth and oldest rocks

**Geologic Time Scale:** *for lecture, there will be more for lab* ***only exam***

* Know the three Eras (Paleozoic, Mesozoic, Cenozoic), and the age in millions of years ago they began.
* Where would you place the Precambrian (when does this begin) and Phanerozoic on the geologic time scale?

**Earth structure***:* ***quiz and exam***

* Know **Earth’s layers** and the physical nature of each: crust; mantle (upper, lower); core (inner and outer); Which 2 layers make up the upper mantle? What is the difference between the lithosphere and asthenosphere? Know the difference between oceanic and continental crust. What is the average thickness of oceanic and continental crust? Why is the crust not considered to be a part of the upper mantle?

**EARTH’S HEAT AND PANGEA *quiz and exam***

* Radioactivity-- Be familiar with the following terms and their connection: decay, half-life, isotope, parent, daughter element?
* Why should you know something about radioactive decay? (2 reasons)
* Alfred Wegener? Evidence supporting Wegener’s hypothesis? Pangaea?
* What is convection? Does convection occur in the lower mantle? Driving force for plates?

**PLATE TECTONICS: *quiz and exam***

1. Tectonic plate: composition (think of Earth’s layers)?
2. Where is ocean crust created and destroyed? Looking at the 3 major ocean basins, what is the approximate age of oldest ocean crust on the seafloor (think 3 major ocean basins)? --where can you find it in general (think in relation to the MOR)?
3. What is seafloor spreading? Harry Hess—evidence to support?
4. Where can we find extensive evidence that Earth’s magnetic field has periods of normal and reverse polarity? What is normal and reverse polarity? Does the magnetic north pole always correlate with the geographic North Pole? Why does the Earth have a magnetic field? Polarity today?
5. How does paleomagnetism support the theory of plate tectonics?
6. What are the 3 driving forces of plate motion? How do they work?
7. What is convection and how does it differ from conduction? Example of convection in Earth? 🡪

**PLATE BOUNDARIES:** Blue font = geographic locations ***quiz and exam***

Be familiar with the geologic processes, features, and geographic locations mentioned below:

1. **Divergent boundary** (2 types): mid-ocean ridge (MOR), rift valley, shallow earthquakes, volcanic activity; *Know the following locations* *are divergent plate boundaries*: East African Rift, Red Sea, Gulf of Calif., East Pacific Rise, Mid-Atlantic Ridge (Iceland). Which locations are ocean-ocean divergent?
* **Convergent plate boundary** two types: 1) Subduction (ocean-ocean and ocean-cont.) 2) Continent-Continent. Be able to associate the following with the correct plate boundary: trench, subduction zone, deep earthquakes, shallow earthquakes, big continental mountains, igneous activity (intrusive and extrusive), volcanic arc, island arc, megathrust earthquakes. What and where is the Ring of Fire? Geologic activity? Which geographic locations are located in the Ring of Fire?
* *Know the following locations* *are convergent plate boundaries*: most of the Pacific (Ring of Fire, ROF) is subduction: Western Pacific (Japan, Philippines); Aleutian Islands, Alaska; Cascades in the Pacific NW of U.S.; west coast of South America (Andes); Central America; Mexico; Indonesia (Indian Ocean).
* Subduction, not in ROF: Caribbean and Mediterranean.
* Himalayas and Middle East (Iran, Pakistan) are cont.-cont. convergent.
* **Transform boundary** (2 types): shallow earthquakes, lacking volcanic activity.
* Ocean transform faults: there are many, always perpendicular to MOR. Understand how the plates move on either side of the transform and MOR?
* Continental transform: San Andreas Fault (plate boundary between which 2 plates?) and N. Anatolian Fault
* **Draw a picture showing** 2 MORS offset by an ocean transform, **2)** label plate A and plate B on each side of both MORS, **3)** Draw arrows to show relative movement on either side of the MORS, then observe those arrows on either side of the ocean transform…are they moving in opposite directions?

**Hot spots: *quiz and exam***

* What is the difference between a hot spot and a mantle plume? What was mentioned about mantle plumes?
* What and where are most mantle plumes located relative to plate boundaries? Do the majority of the mantle plumes coincide with plate boundaries?
* Linear volcanic hot spot islands are supporting evidence for the theory of plate tectonics, how does this work?
* Name the 3 hotspot locations mentioned in class?

**Where is the mantle plume?**

**Where is the oldest volcano?**

**Lithosphere**

**FAULTS: *only exam***

* Normal faults; reverse and thrust faults (what is the difference?); strike-slip faults (left and right lateral)
* Know the difference between the faults listed above: 1) how rock moves along the fault plane, 2) type of stress, and 3) how to interpret in a cross-section view for dip slip and map view for strike slip.
* Be familiar with following terms and where are they located relative to a fault plane: hanging wall, footwall, fault scarp, slickensides.
* Be familiar with following terms: stress, strain, elastic, plastic, brittle
* offset; displacement; slip = all the same! You can measure this.
* What happens when **strike slip faults** develop bends? (specifically a left bend in a RL strike slip fault). Where is the shear stress? The compressional stress (transpressional stress)? Examples of bends in RL strike slip faults? Be able to interpret a figure.
* Can faults occur away from plate boundaries? Why?
* Where is the Basin and Range? Type of faults/stress responsible for Basin and Range topography? Which state should come to mind?
* What types of faults develop along divergent plate boundaries? convergent plate boundaries?

***Please review lecture notes, power point slides, lecture recordings, and Hyndman and Hyndman text, will be helpful. The study guide is designed to help you review the course material. Emphasis will be on integration of terms and concepts.***