

Quiz- Geop380 – Special Topics October 29, 2006

Name:

Daytime telephone number:

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I. Multiple Choice (50 pts).

- Which Earth subdivision has the most volume?
 - Hydrosphere
 - mantle**
 - core
 - lithosphere
 - Asthenosphere
- Density of rock material within the Earth depends upon
 - pressure.
 - temperature.
 - phase transitions.
 - rock type.
 - all of the above**
- A seismic ray path labeled SKS:
 - Has traveled through the mantle**
 - Has reflected off the outer core
 - Has penetrated the inner core
 - Has reflected off the crust
- The velocity of seismic P waves varies most directly with
 - elastic modulus and density.
 - bulk modulus and rock type.
 - strength of the disturbance.
 - shear strength and density.**
 - rock elasticity.
- The Mohorovicic discontinuity, or Moho, is the boundary between _____ and _____.
 - mantle; core
 - crust; mantle**
 - crust; low velocity zone
 - outer core; inner core
 - all of the above
- One of the first scientists to discover the inner core in 1936 was
 - F. J. Vine.
 - James Hutton.
 - Inge Lehman**
 - D. H. Matthews.
- One of the first scientists to discover the liquid core in 1906 was
 - F. J. Vine.
 - Guetnberg Richter.
 - Inge Lehman
 - Richard Dixon Oldham**
- The lithosphere
 - is partly molten and plastic in consistency.
 - was discovered by studying the behavior of seismic waves generated by earthquakes.
 - extends to an average depth of about 300 kilometers.
 - is thickest under the continents, thinnest beneath the oceans**
- The asthenosphere lies entirely within
 - the ocean ridges.
 - the upper mantle.**

- c. the lower mantle.
 - d. the lithosphere.
10. Relative to continental crust, ocean floor crust is
- a. much older.
 - b. slightly older.
 - c. **much younger.**
 - d. the same age.

II. Very Short Answer Questions (30 pts).

11. What is the evident of P-wave shadow zone for?

The shadow zone is an evident that the Earth has a central Core which deflects the P-waves

12. How do we know that the upper mantle is partially molten?

Body wave's velocity is observed to be lower, which makes an evident for a zone of low velocity regarding a molten structure of upper mantle.

13. What is Adams-Williamson's equation used for?

It is used to estimate the density which is needed to estimate the elastic constants of earth materials.

III. Longer Answer Questions (20 pts). Provide your answers on the following sheets. Use sketches if you wish.

14. What are the types of seismic tomography? Which of them might you suggest for Eastern Arabia? What information can it provide?

Two kinds of seismic tomography based upon the type of used data as:

- a) Teleseismic tomography, which use long-distance earthquakes.
- b) Local tomography, which use the local earthquakes in the active seismic zones.

Both of them are used to provide information on the depth of crustal and mantle. Tele-seismic tomography may probe further through the mantle due to used long-distance earthquakes. Thus, the areas of seismic quiescent like Eastern Arabia can be studied through the mantle by the use of teleseismic tomography. Shortly, seismology continuously provide information through the earth since monitoring of seismic waves are providing a tool for probing Earth, regardless any area of seismically active or not.

15. What is the seismic anisotropy? How is it determined?

Anisotropy indicates the variability of heterogeneity through the different directions of Earth. Shear wave splitting provides a tool to monitor comparing the variability of heterogeneity for components of vertical and horizontal. Differences in the velocity, is appeared in observed differences as $SV \neq SH$, may indicate the presence of seismic anisotropy.