GEO 1111 : Lecture 8 – Tectonics and Earthquakes

1) What is strain? What causes strain?

   Strain is the deformation of the rock (size or shape change), and is caused by an applied stress or force.

2) How are joints and faults different?

   Joints are fractures in which no movement occurred; faults are fractures in which movement has occurred

3) (L) and (R) waves are what types of seismic waves? What is the difference between these two? Which is more likely to topple Parliament?

   They are types of surface waves. Love (L) waves have side-to-side movement, Rayleigh (R) waves have a rolling movement like a wave, and are more destructive.

4) 90% of earthquakes occur at less than 100 km depth. Why?

   Because deeper than 100 km, rocks tend to be ductile rather than brittle, so cannot rupture (only flow).

5) In an area that might have tsunamis, would it be more dangerous to live near a coastal region with shallow coastal waters or deeper coastal waters (provided you want to live in an area where tsunamis are a hazard)? Why?

   More dangerous to live along a coast with shallower water because it allows the water to pile up to extreme heights.

6) Why would even a moderate earthquake be especially devastating for cities that are built on saturated sediments such as deltas or glacial sediments (i.e. Vancouver, Ottawa)?

   Liquefaction could take place.

7) Which best contributes to ductile deformation of rock?
   a) High pressure and low temperatures
   b) High confining pressure and low temperatures
   c) High temperature and high extensional forces
   d) Low temperature and low confining pressure
   e) High confining pressure and high temperature

8) A region of down-dropped hangingwalls will have most likely formed by:
   a) Normal faulting
   b) Reverse faulting
   c) Strike-slip faults
   d) Elastic rebound
   e) Thrust faulting

9) A rock that ruptures during deformation is said to behave:
   a) Plastically
   b) Brittlely
   c) Elastically
   d) Ductilely
   e) Rapturely

10) The source location of an earthquake is called the:
   a) Epicentre
   b) Orthocentre
   c) Hypocentre
   d) Seismocentre
   e) Rupture centre

11) How much larger is a Richter magnitude of 5 than a magnitude of 2?
   a) 100x amplitude and 33x energy
   b) 1000x amplitude and 35937x energy
   c) 100x amplitude and 1089x energy
   d) 3x amplitude and 3x energy
   e) 10x amplitude and 33x energy

12) There is no loss or gain of crust in a _____ setting.
   a) divergent plate boundary
   b) back arc basin
   c) transform boundary
   d) continental – oceanic plate boundary
   e) island arc