

GEO 1111 : Lecture 9 – Tectonics

1. 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

2. At divergent plate boundaries one will find:
 - a) thinned crust
 - b) decompression melting
 - c) mantle derived magma
 - d) normal faults
 - e) all of the above

3. Apparent polar wander paths were thought to track the wandering of the Earth's magnetic poles, but we now know those measurements track the movement of:
 - a) glacial ice at the poles
 - b) the tectonic plates
 - c) hot spot migration like Hawaii
 - d) migrating species across the poles
 - e) the uplift of mountain belts

3. The Mariana Trench, the deepest point on Earth's surface, is due to:
 - a) oceanic-oceanic plate collision
 - b) transform faults perpendicular to a mid-oceanic ridge
 - c) sea-floor spreading, causing rifting
 - d) an earthquake due to brittle deformation
 - e) none of the above

4. Plate boundaries are along coastlines:
 - a) when continental crust is subducted under oceanic crust
 - b) when oceanic crust is subducted under continental crust
 - c) never
 - d) always
 - e) none of the above

5. Explain why decompression melting is related to mid-oceanic ridges.

Mid-oceanic ridges involve stretching of the crust, which causes thinning of the crust and this allows deeper, hotter mantle rocks to rise up and approach the surface. As these hot mantle rocks rise, the pressure decreases to the point where they are able to partially melt.

6. Describe tectonic plate push and pull. List two factors that are contributing to the push/pull system.

Slab-pull → pulling of crust into mantle by downgoing slab during subduction

Slab-push → pushing of crust resulting from elevated position of oceanic ridge system

2 factors - gravity and mantle convection (?)

7. Why doesn't continental crust normally subduct?

Continental crust doesn't normally subduct because it's thicker and much less dense than oceanic crust.

8. Explain how you would estimate the age of the oceanic crust at its oldest point if you had a submarine and magnetometer in your possession.

You would estimate the age of the oceanic crust by mapping the magnetic stripes, then calculating an age using distance and time between polarity reversals within the crust.

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

A large earthquake would be especially devastating due to liquefaction
→ the saturated sediments are converted into a mobile fluid

10. If a magnetic mineral is deposited or formed at the equator today, in which relative direction will it be oriented and what will its approximate dip be?

The lines of force around the magnetic equator of the Earth are perfectly horizontal, so the magnetic needle will become horizontal there.
Thus, the angle of dip at the magnetic equator of the Earth will be 0.