

Geol/Atoc 3070 Oceanography 2012 CU Boulder
Prof: Chris Jenkins

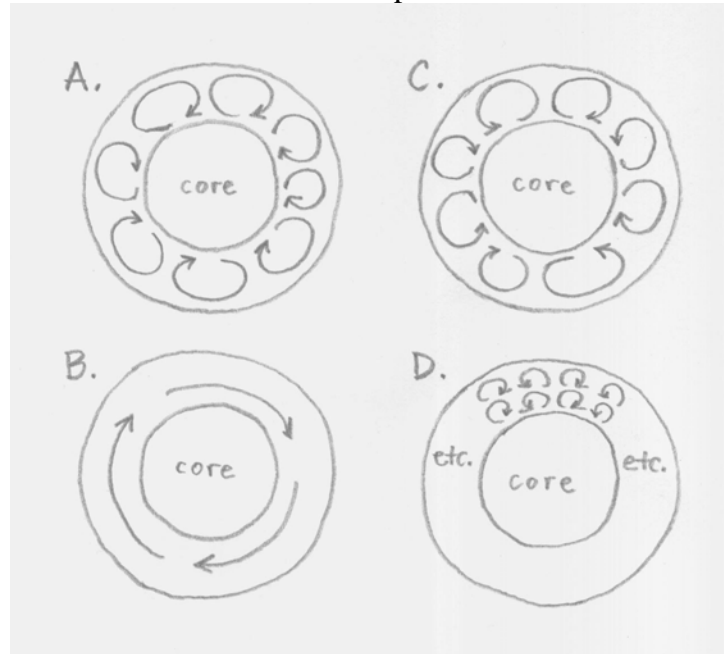
First In-Term Test - Tuesday 14 Feb 2012

Instructions:

- a. Read all the questions CAREFULLY. Then complete all questions and sub-questions to the best of your ability.*
 - b. The time allowed is 60 minutes including 5 minutes reading time to start.*
 - c. No written or electronic assistance is allowed; a student's results will be forfeit if this is determined.*
 - d. You will need pen/pencil, ruler, and perhaps pad paper.*
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QUESTION 1 (*Multiple choice format – mark clearly and unambiguously the choice that you make. Allow 15 mins*)

1.1. Which of these convection modes is most plausible for the Earth's mantle ?



1.2. Airy Isostasy:

- a. Is the study of dynamic uplift and downturning of the Earth's crust
- b. Is too simple to be worth studying
- c. Is a straightforward application of Pythagorean buoyancy theory
- d. Involves compensation of crust/mantle weights at a level in the mantle
- e. Involves compensation of crust/mantle weights at a level in the crust

- 1.3. The distance of an earthquake from an observer is best measured by:
- The amount of noise it makes
 - The relative arrival times of the compressional and shear waves
 - How much damage is done to buildings
 - The time it takes for P-waves to arrive at the seismograph
 - The amount of P- / S-wave conversion
- 1.4. The Greenwich Meridian :
- Is the standard line of latitude
 - Is also known as the International Dateline
 - Is the standard line of longitude
 - Is a small circle
- 1.5. Sidescan Sonars:
- Provide images of the seafloor using electromagnetic beams
 - Have all to be mounted under ships' hulls
 - Operate with signal at about 1 Hertz frequency
 - May produce shadowing in images
 - Are more sophisticated than Multibeam Sonars
- 1.6. At Mid-Ocean Spreading Ridges it is NOT true that:
- The earthquake and volcanic activity exactly coincide in geographic pattern
 - The volcanism is a mix of intrusions and by-and-large quiescent extrusion (flows)
 - The spreading rate is of the order of 1-10 cm/yr, depending which ridge
 - They are made of relatively warm, less dense materials that rise above general ocean bathymetry

QUESTION 2 (*Use a whole blank page if you need to. The more detail you demonstrate that you know and understand, the better grade will be awarded. Allow 20 mins*)

Please draw a labelled diagram of the Earth's gross structure from the center to the surface. Label with the names of the zones and any other geological structure that you are able to show. You can use more-detailed inserts of parts if you wish.

QUESTION 3 (*Brief prose format. To be written in the space below. Allow 20 mins*).

Please describe in readable form how the evidence for Plate Tectonics on Earth unfolded, and how it was related to changes of technology.

END.