

Name: \_\_\_\_\_

**Earth 50 2<sup>nd</sup> Midterm Exam**  
**Multiple Choice (2 pts each)**

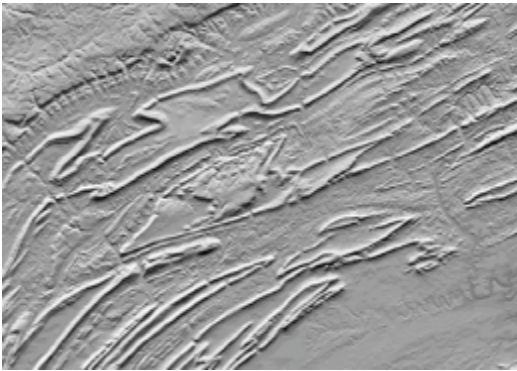
**November 14, 2005**

1. Which of the following rocks is formed by the metamorphism of sandstone?
  - A) slate
  - B) amphibolite
  - C) gneiss
  - D) marble
  - E) quartzite
  
2. The strike of a bedding surface is
  - A) the angle between the bedding surface and horizontal.
  - B) the compass orientation of a horizontal line on a bedding plane.
  - C) parallel with dip.
  - D) a vector perpendicular to the bedding surface
  - E) an east-west direction.
  
3. The Moho is a seismic discontinuity at the base of the
  - A) mantle
  - B) asthenosphere.
  - C) lithosphere
  - D) crust
  
4. ) A fault in which the hanging wall has moved downward with respect to the footwall is a
  - A) normal fault.
  - B) strike-slip fault.
  - C) bedding plane fault.
  - D) thrust fault.
  - E) reverse fault.
  
5. If you encountered much older metamorphic rocks *overlying* younger sedimentary rocks, the plane separating them is likely to be a
  - A) normal fault.
  - B) thrust fault.
  - C) a joint.
  - D) a normal depositional surface

6. Brittle deformation of rocks is favored in all situations EXCEPT

- A) low confining pressures.
- B) low temperatures.
- C) shallow depths.
- D) high temperature.
- E) rapid deformation (high strain rates).

7. The pattern of resistant hills and ridges shown on this shaded relief map is best explained as



- A) a series of plunging anticlines and synclines.
- B) a series of domes.
- C) a series of basins.
- D) normal faults.
- E) a swarm of strike-slip faults.

8. A sample of basalt contains a radioactive isotope that has a half-life of 10 million years. Analysis shows that one quarter of the original parent isotope is still present. How old is the rock?

- A) 2.5 million years
- B) 20 million years
- C) 40 million years
- D) 5 million years
- E) 10 million years

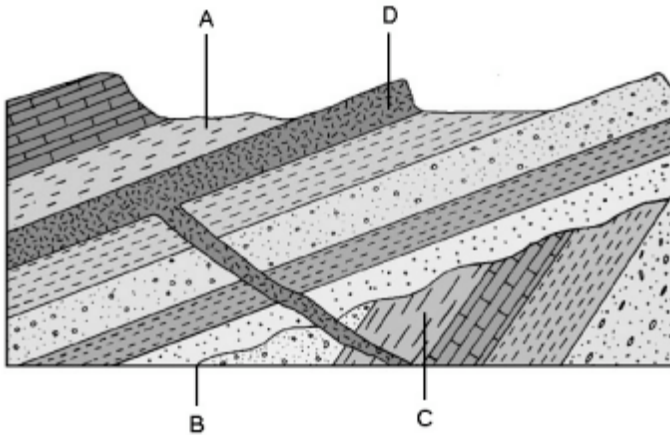
9. The rate at which a radioactive element decays is

- A) influenced by pressure.
- B) influenced by temperature.
- C) influenced the mineral where decay is taking place.
- D) dependent upon the mineral's closure temperature
- E) independent of external conditions.

10. Most of the world's major deserts are located in the

- A) subtropical high-pressure belts.
- B) tundra regions.
- C) Inter-Tropical Convergence Zone (ITCZ).
- D) coastal areas.
- E) upwind sides of mountains.

11. In this cross section, which unit identified by letter is oldest?



- A) The layer of shale labeled A
- B) The erosional unconformity labeled B
- C) The sedimentary unit labeled C
- D) The igneous rock labeled D

11. Which of the following gasses makes up the greatest percent of Earth's atmosphere?

- A) methane ( $\text{CH}_4$ )
- B) carbon dioxide ( $\text{CO}_2$ )
- C) nitrogen ( $\text{N}_2$ )
- D) oxygen ( $\text{O}_2$ )
- E) water vapor ( $\text{H}_2\text{O}$ )

12. Which area provides the moisture for rainfall in the Amazon Basin of South America? Take into account where evaporation is greatest and wind directions.

- A) Northern Atlantic
- B) Southern Atlantic
- C) Western Atlantic
- D) Eastern Pacific
- E) Indian Ocean

13. A fishermen off the coast of Peru notices that the normally strong trade winds are weak and slow. What affect will this have on their livelihood?

- A) a disastrous effect, because the trade winds cause deep, cold, nutrient-rich water to well upward.
- B) none at all, because the wind has little effect on the ocean.
- C) a good effect, because in calm surface water, nutrient-rich deep water comes to the surface.
- D) a bad effect, because the trade winds normally keep heavy storms off the coast.

14. ) The geologic time scale is divided into four main units called eras. The most recent era is the

- A) Precambrian
- B) Mesozoic
- C) Quaternary
- D) Cenozoic
- E) Paleozoic

15. The thickest soils are produced by weathering in the

- A) arctic.
- B) low-latitude deserts.
- C) temperate zones.
- D) equatorial rain forests.
- E) savannas.

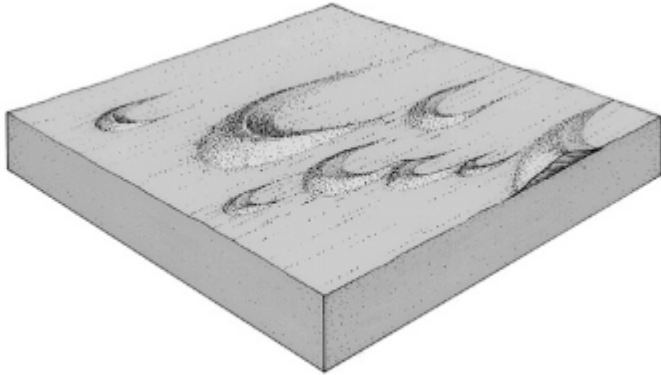
16. ) The primary force driving mass movement is

- A) tidal.
- B) gravity.
- C) geothermal.
- D) tectonic heat.
- E) all of the above

17. ) Water is important to the process of mass movement because it

- A) adds weight to the sediment and provides lubrication.
- B) promotes the growth of vegetation.
- C) assists in the erosion of valleys.
- D) oxidizes minerals.
- E) may precipitate cement.

18. ) The dunes shown in this diagram probably formed where



- A) there was abundant sand and the wind directions were not uniform.
- B) there was abundant sand and the wind directions were uniform.
- C) there was little sand and the wind directions were not uniform.
- D) sand had accumulated along a beach and was then modified by the prevailing wind.
- E) where the wind blew from the left to the right.

19. In P (primary) waves, the particles in a rock body move

- A) at a 45-degree angle to the direction in which the wave travels.
- B) in an elliptical pattern.
- C) back and forth parallel to the direction in which the wave travels.
- D) back and forth at right angles to the direction in which the wave travels.
- E) in a circle like sea waves.

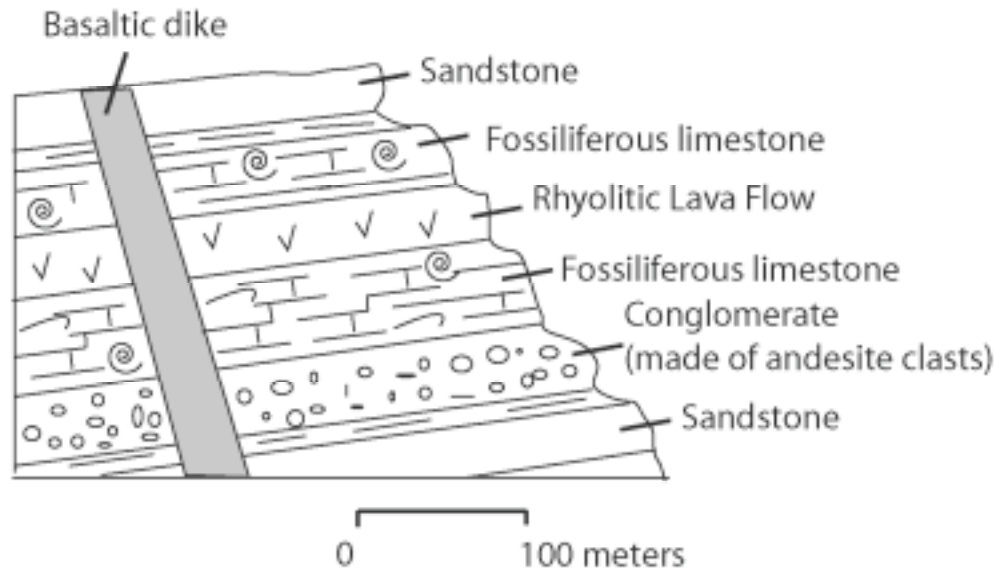
20. The size of the Earth's core is indicated by the shadow zone for

- A) surface waves.
- B) P waves.
- C) S waves.
- D) both P and S waves.

**Short Answer Questions (6 points each)**

21. Where is the low velocity zone (give depth range) and why is it important for plate tectonics?

22. You are trying to determine the absolute age of a series of sediments in a road cut that include coarse conglomerate interbedded with sandstone, fossiliferous limestone, and a lava flow interbedded between the limestone and sandstone. All these rocks are cross cut by a basaltic dike that has metamorphosed to rocks within a few meters of the dike, but not the sediments exposed only a 10 meters away.



- A) Which of these rocks would be most useful for obtaining an absolute age of sedimentation? Explain your answer.
- B) Which of the rocks would be the most useful for dating the age of contact metamorphism? Explain your answer.

23. The locations of deserts on Earth are not random. Describe two major controls on the distribution of desert regions of Earth.

24. Describe how the inclination of the geomagnetic field (and also young rocks that record this field direction) varies across the globe?

Where on the planet is the inclination the greatest?

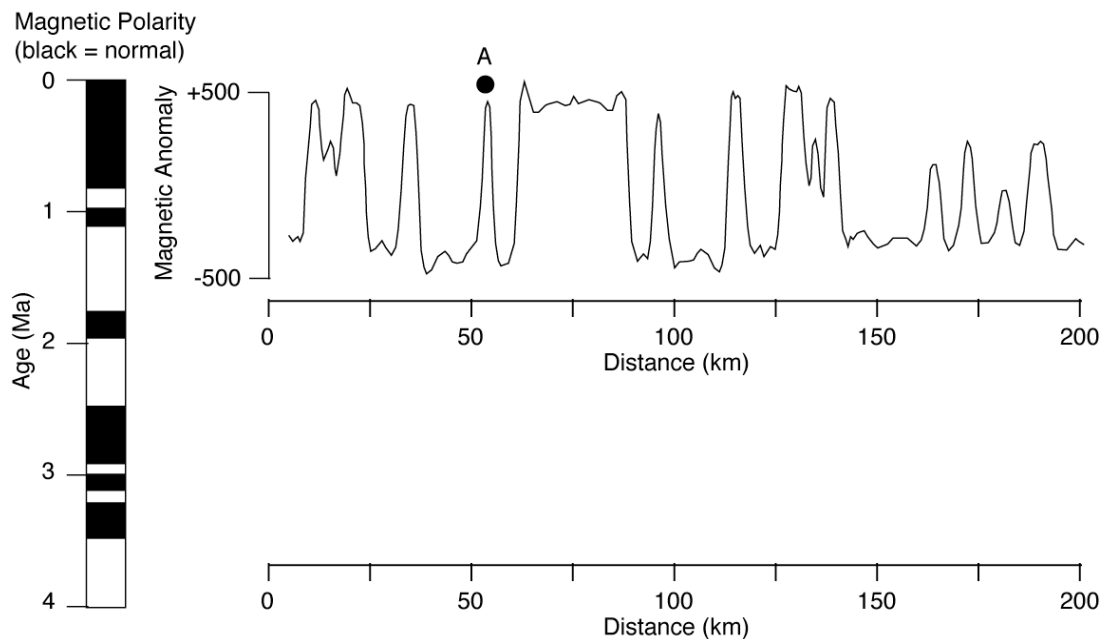
25. Given the magnetic polarity time scale and sea surface magnetic anomaly profile shown below, answer the following questions:

A) At what position (in km) does the spreading center (ridge crest) occur?

B) What is the spreading rate of this ridge crest? i.e. how many km of crust are produced per million years?

C) What is the age (in millions of years) of point A?

D) On the lower distance scale, sketch the approximate topography (height of the seafloor) that might accompany this magnetic profile.

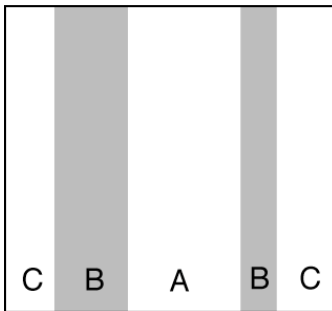


26. Briefly explain how P and S-wave arrivals can be used to locate the epicenter of an earthquake?

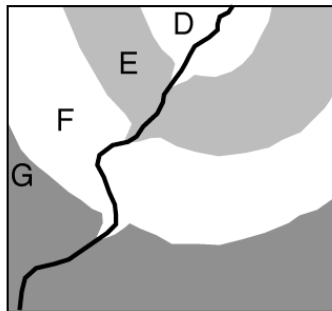
27. What are two lines of evidence that suggest that the Earth has an outer liquid iron core?

28. Three map views of different geologic structures are shown below. Assuming there is no topography (the ground is flat except in the immediate vicinity of streams) and that the capital letters indicate different formations, then:

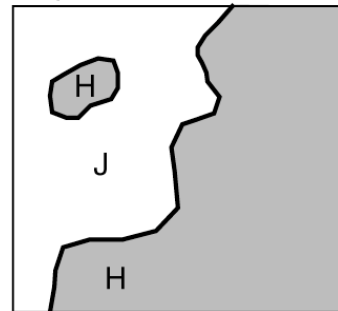
Map 1



Map 2



Map 3



*On Map 1, unit A is the youngest and unit C is the oldest.*

A) Label the strike and dip at each outcrop of unit B. Also indicate which outcrop has the steepest dip by labeling the relative dip angle.

*On Map 2, the heavy line indicates the location of a stream.*

A) Which unit (D,E,F, or G) is the oldest? (you may assume the beds are not overturned)

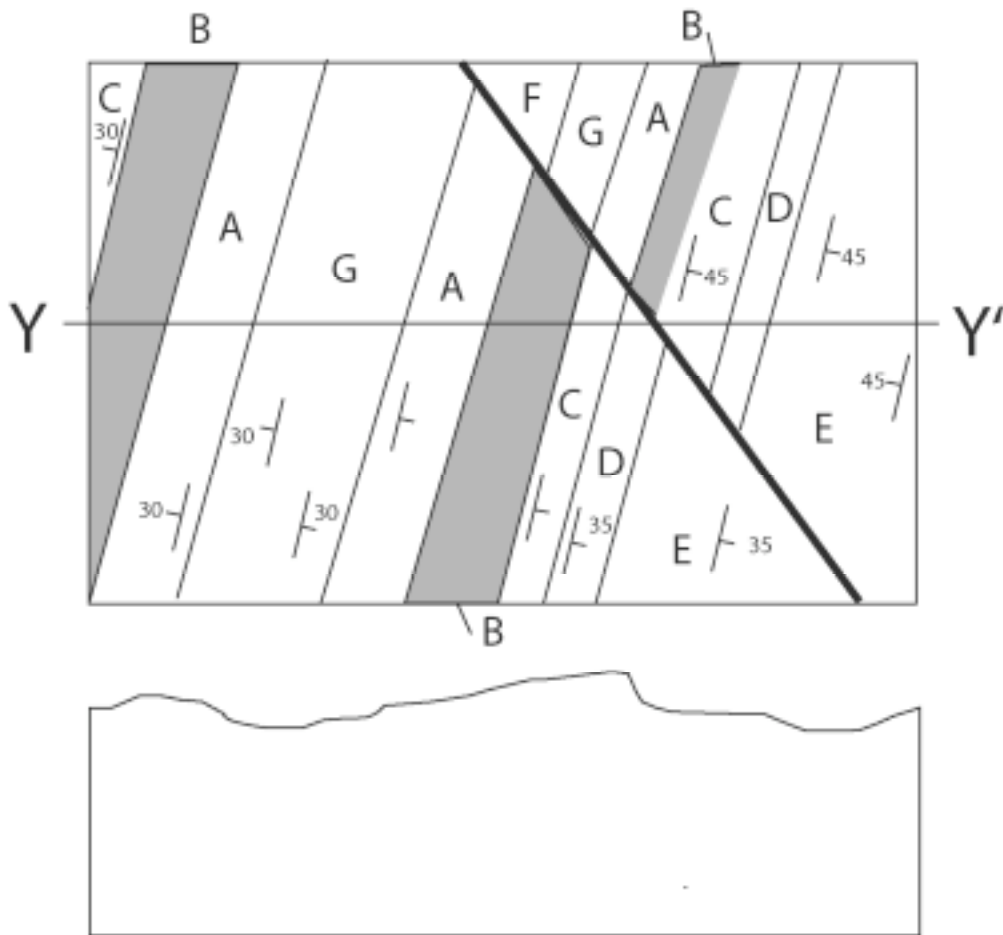
B) What geologic structure is depicted?

*On Map 3, the heavy lines indicate fault contacts.*

A) What kind of fault is this most likely to be?

29. Using the map below, draw across section along profile Y-Y'. Assume the fault (indicated by the heavy line) is vertical.

- A. what kind of geologic structure (s) are indicated on the left side of the fault?
- B. If you drilled a hole in the middle of Formation G on the left side of the fault, what would be the first formation you would encounter below Formation G?



30. The map below shows the position of Earth's continents in the Permian, about 250 my ago. Using your knowledge of atmospheric circulation and ocean circulation, mark the likely location of

- A. Two deserts
- B. One upwelling system
- C. Two subtropical gyres

