Geology 200, Questions for Test 3, December 16, 2009

Topics: Structure, Tectonics, and Geologic Maps; Chapters 7 and 23, plus class lectures (see class web pages for PowerPoint presentations). Bring a straight edge with a scale, plus a pencil with a good eraser, to the test.

Matching: Use each answer only once.

Footwall ______ A. block above fault plane
hanging wall ______ B. horizontal line on bedding plane
graben ______ C. region of maximum curvature in a fold
horst ______ D. downward inclination of a fold hinge
hinge ______ E. block below fault plane
plunge ______ F. block dropped down between two normal faults
strike ______ G. block upraised between two normal faults

What is the difference between a fault and a joint?

Can folding take place in rocks at the surface of the earth? Explain your answer.

Draw a simple block diagram showing a normal fault. Reverse fault. Strike-slip fault.

Another name for a strike-slip fault is a __________ fault.

In both normal faults and reverse faults, how is the hanging wall defined? Foot wall?

A syncline striking N-S has a west limb that dips in the __________ direction.

Imagine an anticline-syncline pair that strikes N-S. The west limb of the syncline is also the __________ limb of the anticline.

Make a sketch showing the difference between an open fold and an isoclinal fold.

Define the difference between a fault-bend fold and a fault-propagation fold.

Ductile deformation of rocks can occur at the same temperature as brittle deformation of rocks.
   A. True
   B. False

When is a reverse fault not a thrust fault?
   A. When the fault plane is nearly horizontal.
   B. When the fault plane is approximately 30°.
   C. When the fault plane is less than 45°.
   D. When the fault plane is greater than 45°.

Which of the following is NOT characteristic of an eroded syncline.
   A. The youngest rocks are exposed in the center.
   B. The strata dip away from the hinge.
   C. The fold is plunging if the hinge is inclined.
   D. The outcrop pattern forms a “V” that opens in the direction of plunge.

Tight folds are normally associated with:
   A. strike-slip faults
   B. bedding plane faults
   C. thrust faults
   D. normal faults
   E. complex faults
Horsts are:
A. bounded by thrust faults
B. pushed up by igneous intrusions
C. the result of compression
D. the result of extension

Strike is measured
A. perpendicular to a level surface
B. as the orientation of a horizontal line on a bedding plane
C. parallel with dip
D. in an east-west direction

A fault in which the hanging wall has moved downward with respect to the foot wall is a
A. normal fault
B. strike-slip fault
C. thrust fault
D. reverse fault

Displacement along faults
A. occurs only beneath the surface
B. occurs in a single event
C. results from plastic deformation
D. occurs only during an earthquake
E. results from recurrent movement over a long period of time

Continental collision is commonly marked by:
A. the formation of large fold belts
B. the development of normal faults
C. thrust sheets
D. all of the above
E. only A and C

If you encountered older metamorphic rocks overlying younger sedimentary rocks, the plane separating them would be a:
A. normal fault
B. thrust fault
C. a joint
D. a normal depositional surface

Grabens are commonly valleys that are:
A. bounded by thrust faults
B. bounded by normal faults
C. the result of compression
D. formed by folding

Brittle deformation of rocks is favored in all situations EXCEPT:
A. low confining pressures
B. low temperatures
C. shallow depths
D. high temperature

Compression is related to:
A. folding and crustal thickening
B. normal faulting and crustal thickening
C. stretching and crustal thinning
D. tension and thickening

Arrange the following geologic provinces of the eastern U.S. in correct order from west to east starting with A and ending in D:

Blue Ridge
Plateau
Great Valley
Valley and Ridge
Field Trip Questions:
What geologic structure is in the center of Greenland Gap?
What formation caps the top of the Wills Mountain anticline?
What happened when you hit the Tuscarora Sandstone with a rock hammer?
Approximately how many feet of sedimentary rocks have eroded away above the Valley and Ridge based on our analysis of the stratigraphic section and the estimated depth of burial for Pennsylvanian-age coals?
What is the orientation of the bedding of the rocks at Seneca Rocks? How did they get that way, and what type of structure are they part of?

Which of the following is not one of the three major structural components of all continents?
A. shield
B. stable platform
C. geosyncline
D. folded mountain belt

Which of the following is NOT characteristic of continental shields?
A. granite batholiths
B. belts of old, intensely deformed rocks
C. generally low relief
D. high-grade metamorphic rocks
E. presently subject to mountain building forces

Sediment on the continental shelf is predominantly:
A. shallow marine shale and limestone
B. reefs and reef debris
C. the result of turbidity currents
D. non-marine fluvial deposits
E. the result of deep sea fan deposition

The Appalachian Mountains are noted for:
A. nappes
B. strike-slip faults
C. folds
D. normal faults
E. active volcanoes

After erosion and isostatic adjustment of a mountain belt, the subsequent evolutionary history of the landscape:
A. is not influenced by climate
B. will be dominated by flood basalts
C. will be uneventful
D. is closely related to changes in sea level
E. all of the above

Inverted valleys result from:
A. folded lava ridges
B. lava flows extruded on a linear ridge
C. erosion around lava flows
D. dissection of high plains

Natural arches develop in massive sandstone formations as a result of wind erosion.
A. True
B. False

Which of the following features is characteristic of a landscape immediately following local volcanism?
A. butte
B. inverted valleys
C. volcanic necks
A depositional feature formed from coalescing alluvial fans along the base of a mountain range is:

A. a peneplain
B. a pediment
C. a playa
D. a bajada
E. a monadnock

Which of the following features is not formed on a domal uplift?

A. cuestas
B. faceted spurs
C. strike valleys
D. hogbacks

Which of the following is not a landform associated with the evolution of horizontal strata in an arid region?

A. butte
B. mesa
C. strike valley
D. cliffs and slopes

Rates of erosion:

A. are usually much greater than rates of uplift on the continents
B. increase during periods of rapid tectonic uplift
C. increase in the late stages of erosion of a mountain belt
D. are independent of the amount of uplift

Dendritic drainage patterns, broad domes, and basins are characteristic of a continent’s:

A. stable platforms
B. shields
C. folded mountain belts
D. magmatic arcs

Karst topography forms in what type of climate?

A. humid
B. desert
C. polar
D. all of the above

The continental shields consist mostly of:

A. metamorphic and igneous rocks
B. remnants of ancient oceanic crust
C. Phanerozoic sedimentary rocks
D. Precambrian sandstones

The formation of the Basin and Range is believed to be the result of:

A. motion caused by plate rotation
B. compression forces caused by plate collision
C. extensional forces and rifting
D. fractures caused by igneous intrusion

The coastal plains of the United States usually have the following landforms:

A. cuestas and strike valleys
B. buttes and mesas
C. inverted valleys
D. lowlands and mesas

Matching: Use each answer only once.

Differential erosion  _____
Dendritic drainage  _____
Hogback  _____
Inverted valley  _____
Mesa  _____

A. mesas and buttes capped by old lava flows
B. erosional remnant of resistant flat strata
C. erosional remnant of tilted strata
D. develops on stable platform
E. produces ridges and valleys
Continental shields are presently being subjected to mountain building processes.

A. True
B. False

Describe the difference between stress and strain.

Based on the diagram below, describe the origin of the Sideling Hill Syncline on I-68 in Maryland.

Make a sketch showing the difference between a monocline and an anticline.

Draw the geologic map symbols for each of the following:
- Strike and dip of beds
- Horizontal beds
- Vertical beds
- Overturned beds
- Contact between two geologic formations
- Plunging anticline
- Plunging syncline
- Normal or gravity fault
- Strike-Slip fault
- Thrust fault

Be able to draw a strike-slip fault showing right-lateral displacement. Left-lateral displacement.

Faults are the result of _________________________ deformation.

Folds are the result of _________________________ deformation.

Be able to draw a generalized cross section along a line on a geologic map with anticlines and synclines.

Be able to determine plunge direction for both anticlines and synclines.

Questions from the Giles Co. Report: There will be several questions taken directly from the Giles Co. report you were given to read. These questions will be “open book”, so be sure to familiarize yourself with all the figures and diagrams of the report and where information on various topics is located in the report.