

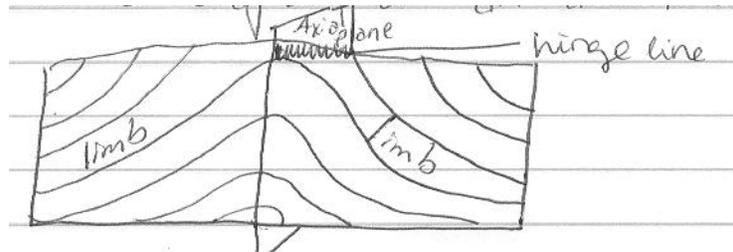


Q&A:

		High Temperature
Brittle	—	High Pressure
Ductile	—	Low Temperature
	—	Low Pressure

Q: Draw a diagram of an anticline.

A:



Q: Match the metamorphic rock with its foliated texture

A: slate	—	mica crystals big enough to see
phyllite	—	half-melted
schist	—	rock cleavage
gneiss	—	banded
migmatite	—	fine-grained schistosity

Q: Put the rocks in order from low to high metamorphic grade.

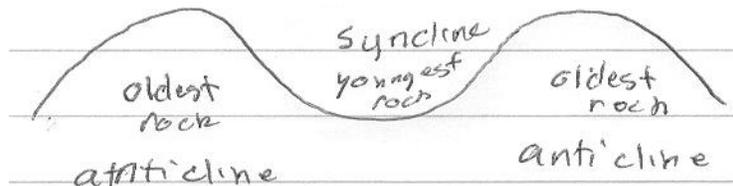
A: shale	sedimentary parent rock
slate	low-grade
phyllite	
schist	
gneiss	high-grade

Q: Matching – metamorphic rocks

A: <u>rock</u>	<u>metamorphic grade</u>
shale	not metamorphic
slate	low grade
phyllite	medium grade
gneiss	high grade

Q: Draw a diagram of a symmetrical fold and label the type it, and tell where the older and younger rocks are.

A:



Q: Earthquakes cause subsidence. Explain what this entails.

A: Subsidence is then the ground falls inward with higher depths in the center.

Q&A:

Ductile	Change of shape without fracture
Brittle	Breaks once its strength is exceeded
	Includes clays and most metals
	Includes bones, pencils, and glass objects

Q: Match the metamorphic rock with its parent rock.

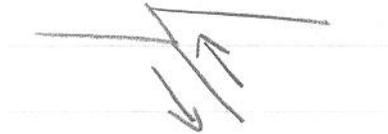
A: <u>E</u> marble	A) slate
<u>B</u> gneiss	B) schist
<u>A</u> phyllite	C) phyllite
<u>D</u> slate	D) shale
<u>C</u> schist	E) limestone
<u>F</u> metaconglomerate	F) conglomerate

Q: Match the region with the appropriate rock.

A: <u>C</u> High grade regional	A. Hornfels
<u>A</u> Contact	B. Phyllite
<u>B</u> Low grade regional	C. Gneiss
<u>D</u> Hydrothermal	D. Slate

Q: Draw a diagram of a reverse fault showing direction of movement.

A:



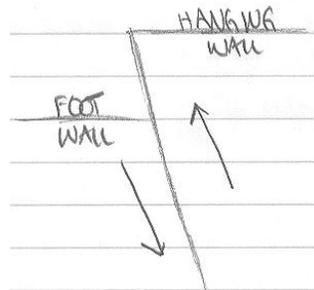
Q: Which metamorphic rock is likely to form when two oceanic plates are in tension?

A: Quartzite  
 Hornfels ←  
 Gneiss  
 Slate

[actually, serpentinite is the most likely result from hydrothermal metamorphism of basalt]

Q: Draw a reverse fault and label the hanging wall and footwall.

A:



Q: Name two types of seismic waves.

- A: a) P waves and S waves ←  
 b) Z waves and r waves  
 c) F waves and u waves  
 d) P waves and Z waves

Q: Describe the process in which shale transforms to gneiss. Include methods of metamorphism and temperature and pressure interactions.

A: Shale moves through regional metamorphism and with the steady increase of both temperature and pressure, the metamorphic grade increases. It transforms from shale to slate to phyllite to schist to finally gneiss. This steady increase in metamorphic grade is due to regional metamorphism.

Q: Migmatite's texture, grain size, and parent rock are:

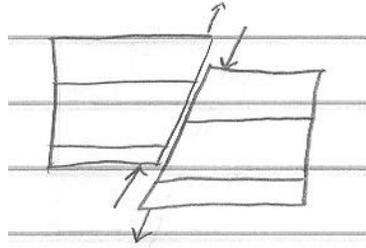
- A: a) foliated, medium to coarse, shale ←  
 b) weakly foliated, fine, any rock type  
 c) nonfoliated, coarse, bituminous coal  
 d) foliated, medium to coarse, quartz

Q: Match with the best answer.

- A: Lowest grade \_\_\_\_\_ Slate  
 Highest grade \_\_\_\_\_ Migmatite  
 Dynamic \_\_\_\_\_ Metaconglomerate [actually, fault breccia or  
 mylonite would be better matches]  
 Intermediate grade \_\_\_\_\_ Schist

Q: Draw a diagram of a reverse fault

A:



Q: Order the following descriptions, from least (1) to greatest (4) of the Modified Mercalli Intensity scale.

- A: 3 Some well built wooden structures destroyed. Most masonry and frame structures destroyed. Ground badly cracked.  
1 Not felt except by a very few under especially favorable circumstances.  
2 Felt by nearly everyone. Many awakened. Disturbances of trees, piles, and other tall objects noticed.  
4 Damage total. Waves seen on ground surfaces. Objects thrown upward into air.

Q: Which wave will show up first when dealing with earthquakes?

- A: a) P ←  
 b) tidal  
 c) S  
 d) none of the above

Q: What are the metamorphic agents?

A: They are heat, pressure, and chemically-active fluids

Q: If there is high temperature, high pressure, but low strain rate, what is the resultant effect?

- A: a. brittle  
 b. ductile ←  
 c. elastic

Q: What type of horizontal stress is active where rock bodies are shortening horizontally and lengthening vertically?

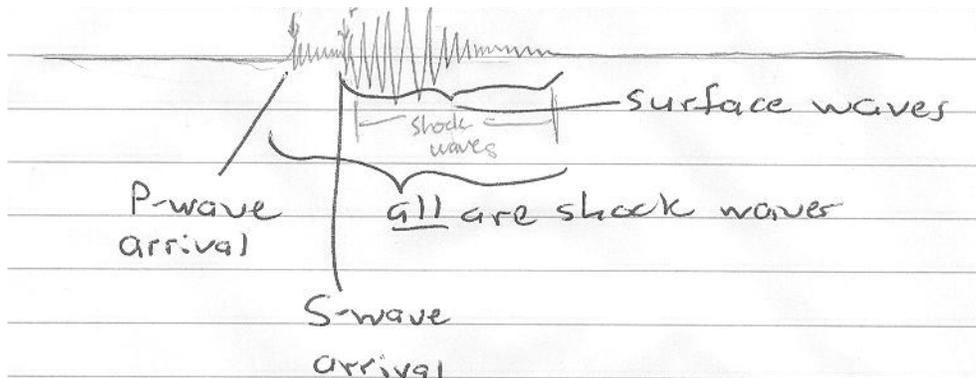
- A: compression ←  
 tension  
 shear

Q: What is the difference between an anticline and a syncline?

A: An anticline is an upfold or arching of rock layers and a syncline is a downfold or trough.

Q: Draw a diagram of a seismograph reading during an earthquake and label the S-wave arrival, the P-wave arrival, and the surface waves.

A:



Q: Rank these earthquakes in order of increasing magnitude (1 = lowest / least destructive, 3 = highest / most destructive)

- A: 2 San Francisco (magnitude 8)  
1 Northridge (magnitude 6)  
3 Alaskan / Good Friday (magnitude 9)

Q: What are the four types of metamorphism?

A: Contact, Regional, Hydrothermal, Dynamic

Q: What metamorphic rocks show foliation?

A: Slate                      Marble  
 Phyllite                     Quartzite  
 Schist                        Breccia  
 Gneiss                        Metaconglomerate  
 Hornfels                     Migmatite

[Metaconglomerate CAN be foliated, though it is not required to be]

Q: Put in order from lowest to highest temperature and pressure.

A: Zeolite facies                      L temp and pressure  
 Greenschist facies                    ↓  
 Amphibolite facies                    ↓  
 Granulite facies                        H temp and pressure

Q: List three geologic structures associated with deformation.

A: elastic deformation, ductile deformation, brittle failure