

High School Advanced Geology Exam May 2014

Name:

Provide complete short answers to the follow questions.

1. Name one depositional environment for **sediment/sedimentary rocks**.

Name one type of sediment/sedimentary rock you would expect to find in this environment.

Name 1 (one) sedimentary structures you would expect to find in this environment.

6 pts

depositional environment =

one type of sediment/sedimentary rock =

sedimentary structure =

2. Briefly describe **TWO (2)** lines of evidence that **Wegener** used to support his hypothesis of **continental drift**? 4pts

3. The cross-section below shows Wasatch Mountain State park in Utah.

Layer F is metamorphic quartzite about 800 million years old.

Layers X,I,A,O are sedimentary rocks.

Layer "O" contains trilobites. Layer "T" contains dinosaur bones.

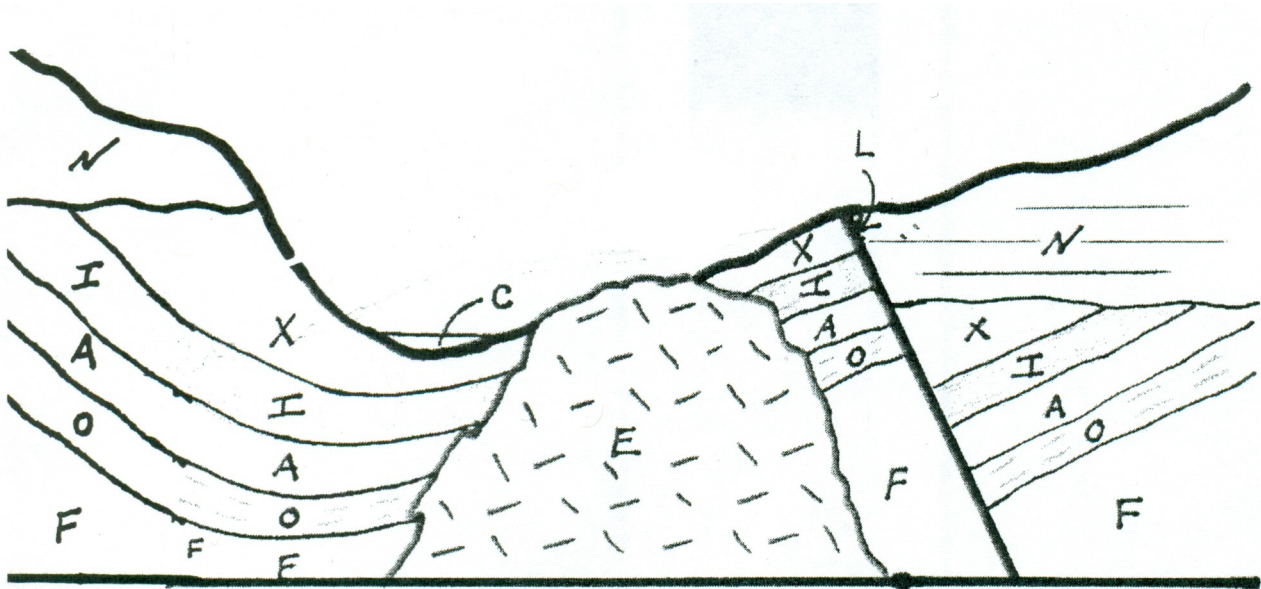
Layer "N" is a lava flow. Layer "E" is granite that is 45 million years old.

Layer "C" is gravel in the present day river.

LIST THE EVENTS from oldest to youngest. 10 ptsuse words like "layers _ were _ deposited"

Draw a line of "XXXXXXXXX"s along an unconformity. 2 pts

What layer might contain mammal fossils? 2 pts



Oldest (#1) to Youngest (#10)

!!!!List EVENTS/PROCESSES, not just letters!!!!

1.

2.

3.

4.

5.

6.

7.

8.

9.

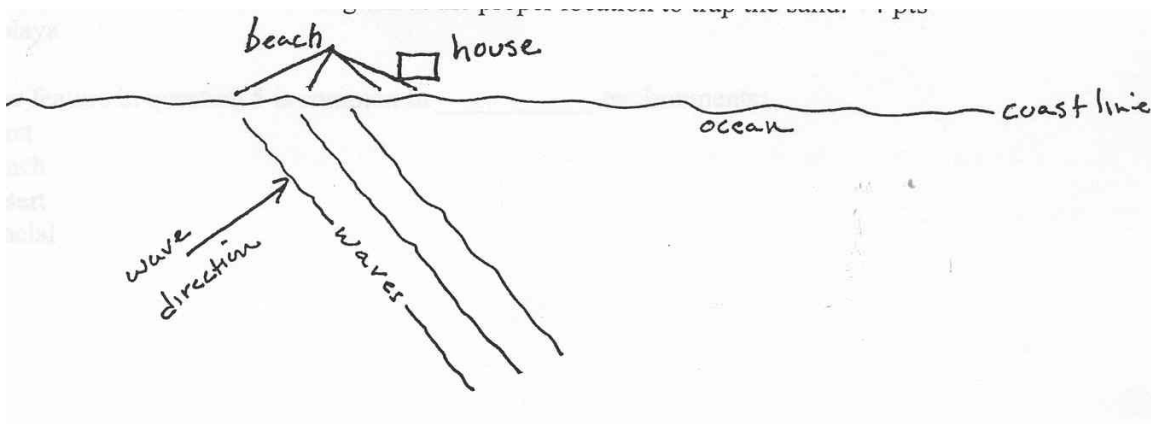
10.

Youngest

Don't forget the "XXXXXXXXX"s

What layer might contain mammal fossils?

4. Buck's house is on a coast line. Waves are eroding his beach. Disregarding state regulations he plans to build a structure to help trap sand on the beach directly in front of his house (bad Buck bad). **Draw a structure** on the diagram at the proper location to trap the sand. **Draw in the new beach** that would form because of the structure. 4 pts



5. The thought of Michigan under a glacier seems like a far-fetched idea. How can you best convince your friends and family that this is a fact, not some hair-brained scientific fad? **Describe two** types of evidence/data that help prove glaciers did flow across our state. Be specific (and convincing). 4 pts

6. The cartoon below shows the folded rocks layers beneath a hillside. Spend a minute thinking about the orientation of the layers and how groundwater would move through them. Layer a is sand and gravel. Layer b is shale. The rock layers rest on unfractured basalt. A geologist needed to find water and drilled many wells. The wells are labeled r to z. You are probably better trained and smarter than the geologist. Please answer/do the following. Note: there are many possible answers. Your answer just needs to make geologic sense.

In what layer or layers is an **unconfined aquifer** most likely found?

Label a likely location of watertable in the **unconfined aquifer**.

Do any wells (r to z) reach the watertable you labeled? If yes, which one(s)?

Now, complete the diagram to show a confined aquifer.

Based on this diagram **label layers c, d, and e** with an appropriate rock type **AND** if each layer is an aquitard or an aquifer. An example is shown in layer b. Remember, your answer must make sense to show a confined aquifer at depth, below the hillside.

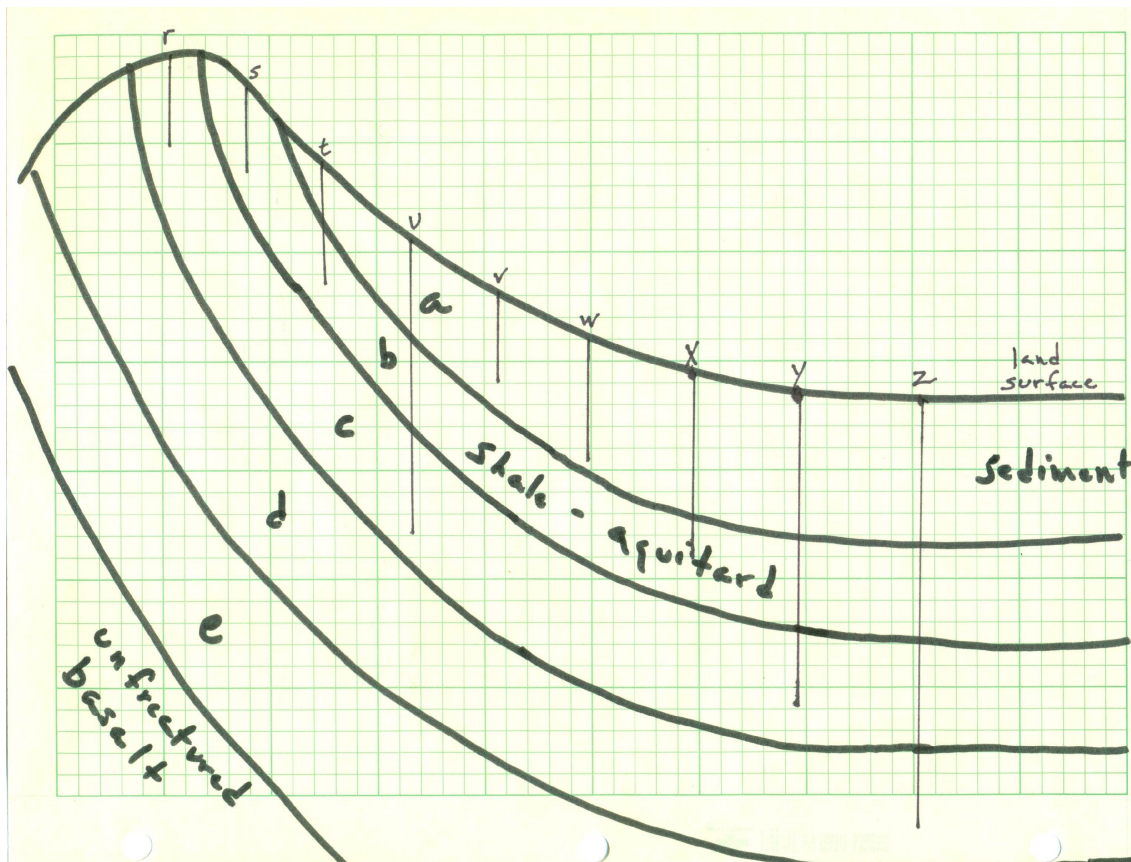
Label the location of recharge area in your **confined aquifer**.

Label the location of watertable in the **confined aquifer**.

Based on the where you drew the watertable in the **confined aquifer** which well or wells (r to z) would contain groundwater?

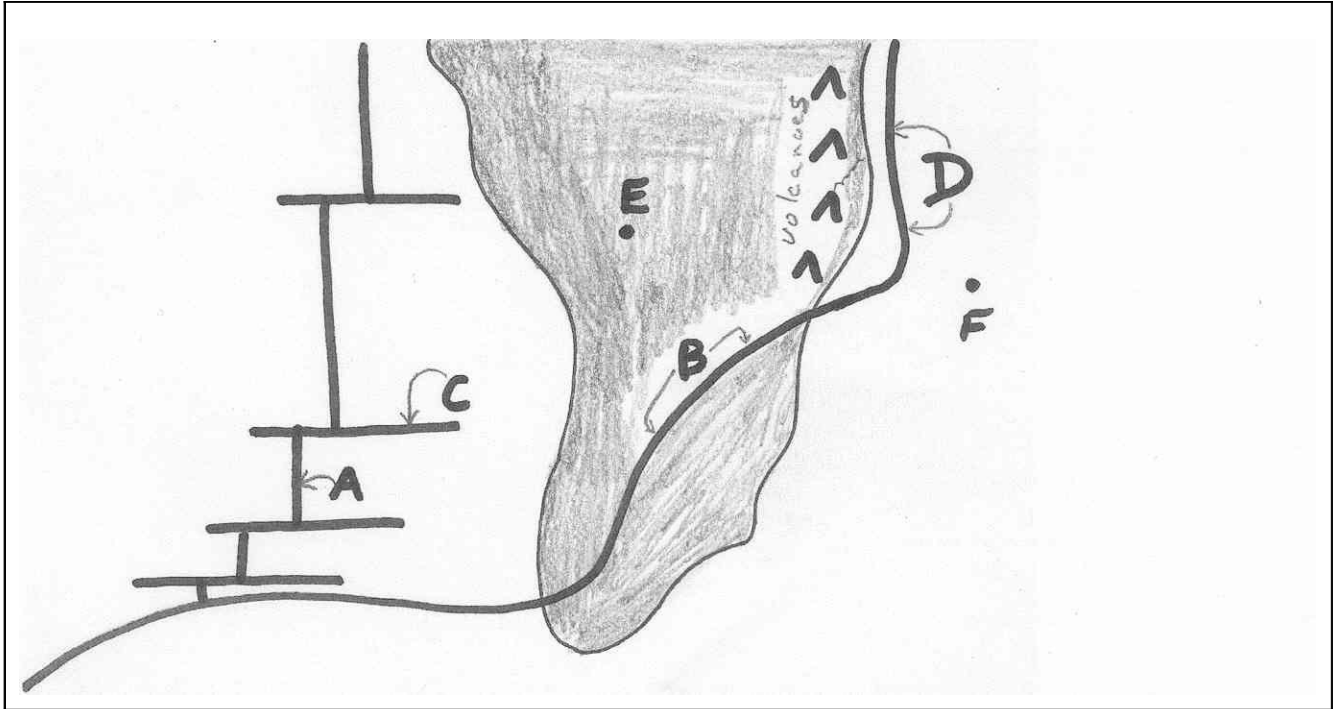
Would the groundwater in this well need to be pumped to the surface? Explain your answer.

13 points total!!!



Reread the question. Is your answer complete?

9. The map below represents a small piece of the earth. Use the base map below to answer the following questions. Oceans are indicated by white. A continent is shaded gray. The thick black lines show the location of, but not the type, of tectonic boundaries. Be sure to answer every question below.



How many plates are shown on the map? 1 or 2 or 3 or 4 or 5 or (circle one) 2 pts

Place an "O" on the map where you expect to find the oldest oceanic crust. Justify your answer. 2 pts

What is the composition of the rock erupted at the volcanoes shown on the map? 2 pts

Location "A" has only shallow earthquakes and volcanism.

What type of plate boundary is it likely to be? 2 pts

What is the composition of the rock erupted at the volcanoes at Location "A"? 2 pts

Location "B" has shallow earthquakes and no volcanism. What type of plate boundary is it likely to be? 2 pts

Explain why there is no volcanism at Location "B"? 3 pts

What type of plate boundary is it likely to be at location "C"? 2 pts

What type of plate boundary is it likely to be at location "D"? 2 pts

At what location is there a trench? A or B or C or D (circle one) 2 pts

At what location is there an ocean ridge? A or B or C or D (circle one) 2 pts

At point E, what direction is the plate moving? North is to the top. 2 pts

At point F, what direction is the plate moving? North is to the top. 2 p

Quietly leave your seat and go to the 3D maps on the board or walls. Answer the next set of questions.

Identify these features in "The Earth" 3-D map:

24. The feature at location "a" is a(n):
- a. continental shelf
 - b. continental slope
 - c. seamount
 - d. ocean island plateau
 - e. abyssal plain
 - f. ocean ridge
 - g. trench

25. The tectonics at location "a" would be characterized by:

- a. divergence
- b. convergence
- c. transform/shear

26. The feature at location "b" is a(n):

- a. continental shelf
- b. continental slope
- c. seamount
- d. ocean island plateau
- e. abyssal plain
- f. ocean ridge
- g. trench

27. The rocks at location "b" are probably :

- a. andesite
- b. basalt
- c. conglomerate
- d. diorite
- e. evaporites

28. At this location on the Eurasian plate the movement is roughly to the:

- a. north
- b. east
- c. south
- d. west

Please return quietly to your seat and resume testing. Short answer.

31. The cross-section below shows Nosuch Place State Park in Utah. The granite is about 245 million years old. The dike "x" is about 65 million years old. Layers k,i,t,c, a, b, r, and d are sedimentary rocks. Layer "c" contains ammonites. Layer "i" contains mammal bones. LIST THE EVENTS from oldest to youngest. 8 pts

Draw a line of "XXXXXXXXX"s along an unconformity. 2 pts

What layer might contain trilobite fossils? 2 pts

Oldest

1.

2.

3.

4.

5.

6.

7.

8.

Youngest

Don't forget the "XXXXXXXXX"s

What layer might contain trilobite fossils?

