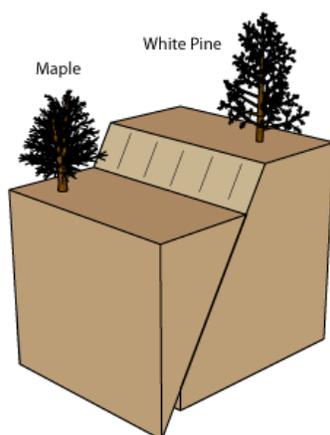


## Structural Geology –Practice Questions and Answers

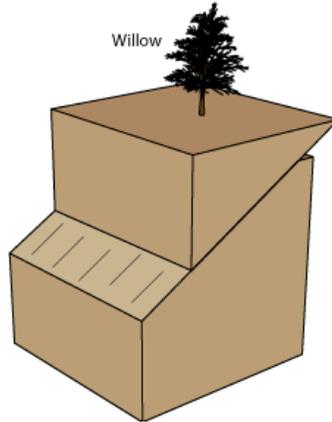
*Revised November 2008*

1. Terms used to describe surfaces across which there has been perceptible displacement are many. However, most geologists would prefer one of the following terms: (a) joints, (b) fractures, (c) cracks, or (d) faults. What term best describes a surface across which there has been perceptible displacement?
2. Force is a term common to physics. Its classical expression is  $\text{Force} = \text{mass} * \text{acceleration}$ . However geologists are more concerned with the intensity of force or more succinctly the stress. Stress is defined as \_\_\_\_\_ .
3. Stresses produce strains in Earth materials. What are strains?
4. There are two end-member varieties of faults: dip-slip and strike-slip. The displacement along a strike-slip fault is \_\_\_\_\_ to the strike of the fault.
5. The orientation of a plane in space is expressed by its attitude; a term consisting of two components, strike and dip. Define strike. Define dip.
6. Though many beds are upright others are not. For example, an overturned bed is one that has been rotated more than \_\_\_\_\_ degrees.
7. A dip-slip fault consists of the dipping fault surface and hanging and footwall blocks. The hanging wall block lies \_\_\_\_\_ the dipping fault surface.
8. In the following illustration what block is the White Pine located on? What block is the Maple located on? What kind of fault is illustrated?

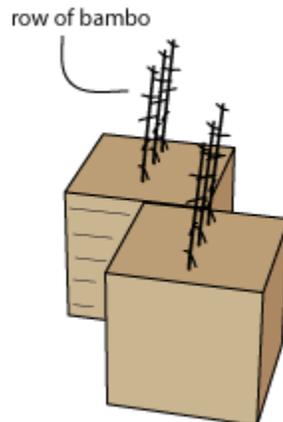


9. The footwall block lies \_\_\_\_\_ a dipping fault surface.
10. What do you call a three dimensional surface separating Earth material of differing aspect?

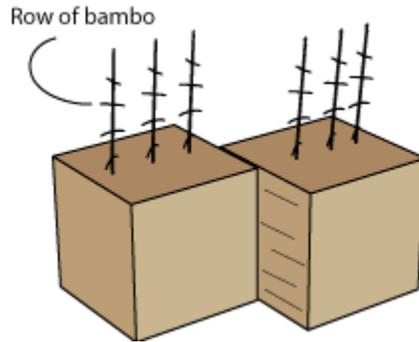
11. In a dip-slip fault, if the hanging wall block moved up relative to the footwall block, then the fault is classified as a \_\_\_\_\_ .
12. In a dip-slip fault, if the hanging wall block moved down relative to the footwall block, then the fault is classified as a \_\_\_\_\_ .
13. In the following illustration what block is the Willow located on? What kind of fault is illustrated?



14. Imagine the following. A road is cut by a vertical dipping fault. As you walk along the road toward the fault, at the intersection of the fault and road, you have to turn to your right and walk some distance along the fault until you encounter the continuation of the road. What would you call the fault?
15. Imagine the following. A set of rail road tracks are cut by a vertical dipping fault. As you walk along the railroad tracks toward the fault, at the intersection of the tracks and the fault, you have to turn to your left and walk about 10 meters along the fault until you encounter the continuation of the railroad tracks. What would you call the fault?
16. In the following block diagram, what kind of fault is illustrated?



17. In the following block diagram, what kind of fault is illustrated?



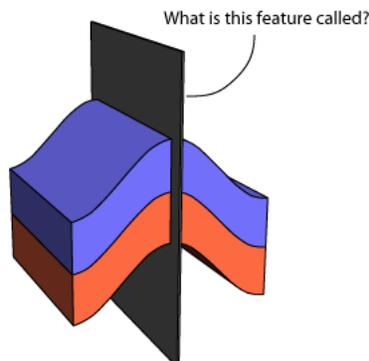
18. Folds are either anticlines or synclines. Many large hydrocarbon reservoirs occur within the cores of anticlines while adjacent synclines may contain the source of such material. Folds are \_\_\_\_\_ distortions of rock bodies.

19. Take a piece of paper and bend it into a fold. Now visually locate the locus of all points of maximum curvature on the folded piece of paper. Imagine now that the folded piece of paper is a bed of sandstone, 3 meters thick and extending over a 1 square kilometer area. The locus of all maximum points of curvature on a folded layer is termed the \_\_\_\_\_.

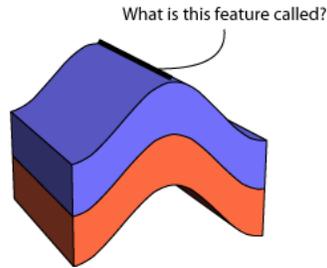
20. Take a book from your pack or book shelf. Bend the pages into a fold. Now imagine that the pages of your book represent a sequence of sandstones beds separated by mudstones. That is, the first page is a sandstone bed, the second a mudstone bed, the third another sandstone bed, etc.. The surface that contains all of the hinge lines in a given fold in a sequence of beds is called the \_\_\_\_\_.

21. Look closely at the fold that you created in the pages of the book (see previous question). Note the geometrical relationship between the axial surface and the rest of the fold. The limbs of the fold occur on either side of the axial surface. The axial surface \_\_\_\_\_ the limbs of a fold.

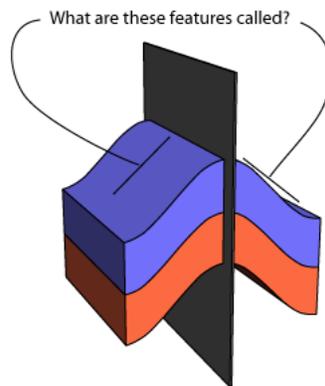
22. Please answer the question shown in the following illustration?



23. Please answer the question shown in the following illustration?



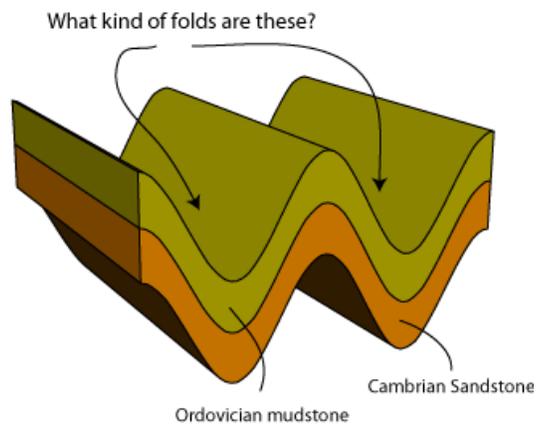
24. Please answer the question shown in the following illustration?



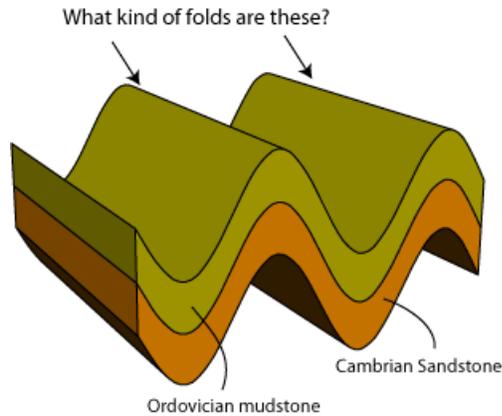
25. In an anticline layers of Earth material converge in what direction?

26. In a syncline layers of Earth material converge in what direction?

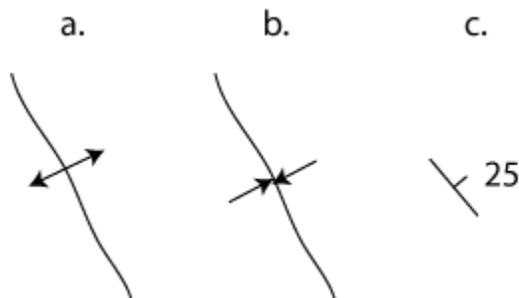
27. Please answer the question shown on the following illustration.



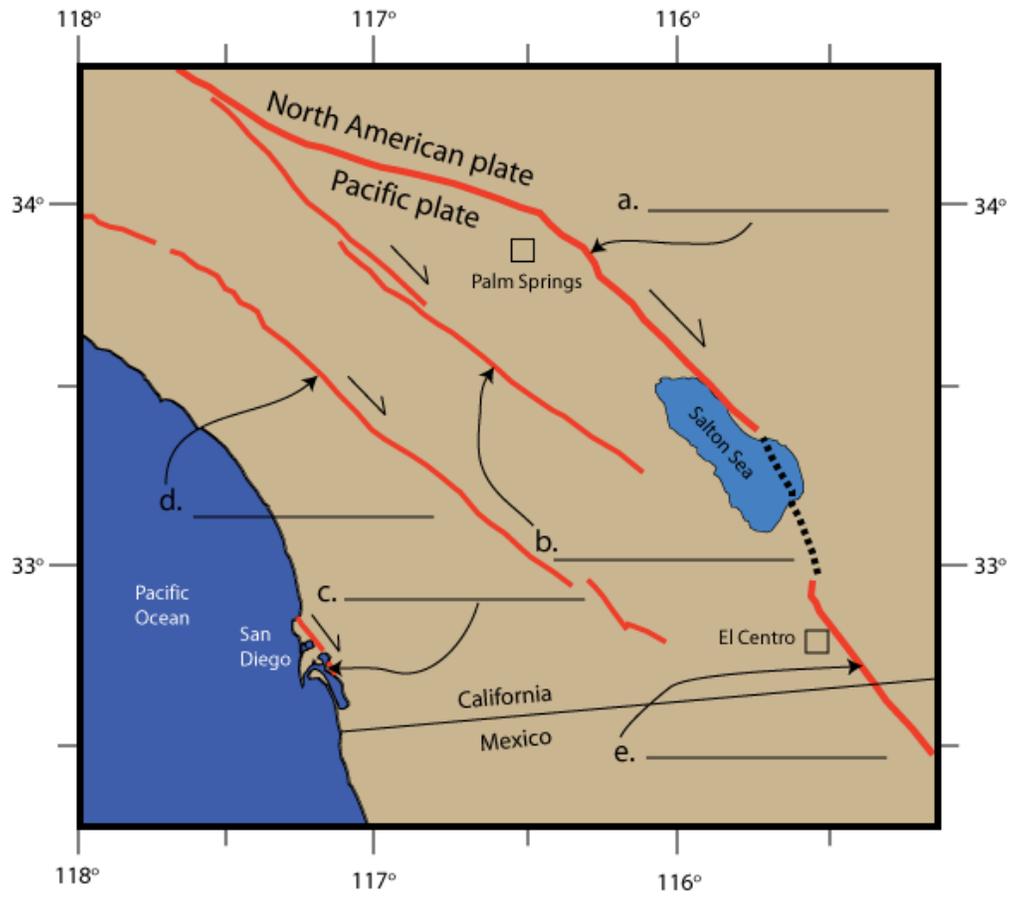
28. Please answer the question shown on the following illustration.



29. Which of the following is not a stress term? (a) megaPascal, (b) Pascal, (c) kilobars, (d) kilometers
30. Plastic material when stressed beyond a certain critical point called the yield stress flows readily. After unloading (i.e., removing the imposed stress) a plastic material it will \_\_\_\_\_.
31. When a stress is applied to an elastic material its response will vary dramatically from that of a plastic material. After unloading (i.e., removing an applied stress) an elastic material it will \_\_\_\_\_.
32. Structures that closely resemble planes are common features of the crust of planet Earth. Examples include beds, joints, and faults. The attitude of a plane is expressed by its \_\_\_\_\_ and \_\_\_\_\_.
33. What kinds of structures are represented by the following geologic map symbols?



34. Please fill in the missing labels for the major faults shown in the following illustration.



## Answers

1. (d) faults
2. force divided by area
3. distortions or changes in shapes
4. parallel
5. The direction of a line produced by the intersection of a dipping and horizontal plane. Strike is normally given as a direction relative to north. Examples include N20W, N45E, etc. Dip is the angle between an inclined and horizontal plane measured in a plane that is at right angles to strike.
6. 90
7. above
8. The White Pine is on the footwall block. The Maple is on the hanging wall block. A normal fault is illustrated.
9. below
10. contact
11. reverse
12. normal
13. The Willow is on the hanging wall block. A reverse fault is illustrated.
14. right-lateral strike-slip fault
15. left-lateral strike-slip fault
16. left-lateral strike-slip fault
17. right-lateral strike-slip fault
18. curvilinear
19. hingeline
20. axial surface
21. bisects
22. axial surface
23. hingeline
24. The limbs of the fold.
25. upward
26. downward
27. synclines
28. anticlines
29. (d) is a unit of length
30. remain distorted or strained
31. regain its original shape and volume
32. strike and dip
33. a. anticline, b. syncline, c. strike and dip of bedding dipping 25 degrees
34. a. San Andreas fault, b. San Jacinto fault, c. Rose Canyon fault, d. Elsinore fault, e. Imperial fault