Historical Geology Test Study Guide

1. How can you use tree growth rings to tell about the age of a tree?
    Each dark ring is a year's growth.

2. How can you use tree growth rings to tell about the weather and climate in an area?
    Thicker rings indicate better growth conditions, such as more precipitation. Thin rings indicate less precipitation.

3. What are the types of organisms that would fossilize well? Why?
    Hard bodied, marine organisms because they don't break down easily and will be covered in sediments quicker.

4. What kinds of things would not fossilize well? Why?
    Soft-bodied organisms get decomposed easily and break apart easily. Terrestrial creatures are also more likely to be scavenged or decomposed because they don't get covered with sediments easily.

5. What are the conditions necessary for a fossil to form?
    Low oxygen, high sediment volume, dies intact (not broken into pieces)

6. What kinds of rocks contain fossils? (igneous, sedimentary, or metamorphic)

7. Where would you find folding in sedimentary rock layers?
    Near a convergent plate boundary, or where a convergent boundary used to be

8. Explain catastrophism and gradualism and give examples of how BOTH have affected the earth's formation.
    Catastrophism is the idea that major, world-wide events have shaped the earth to make it the way it is now. For example, massive flooding washes away sediments, an asteroid kits earth and kicks up dust to create climate change, ect. Gradualism is the idea that gradual processes such as weathering, erosion, deposition, and plate tectonics have shaped the earth to the point it is today. This idea also says that the processes occur at about the same rate now that they did in the past.

9. Who was Nicolas Steno?
    A Danish scientist who created the principles of stratigraphy (cross-cutting, superposition, original horizontality, inclusions)

10. What does the law of crosscutting say?
    If a fault, unconformity, or igneous intrusion cuts across a rock layer, the rock layer must be older.

11. What is the law of superposition?
    Sediments that are laid down first must be older, so the rock layers at the bottom are older (in undisturbed rock layers)

12. What is an unconformity? An igneous intrusion? A fault?
Unconformity= an erosional surface between two rock layers caused by a rise in sea level (typically)
Igneous Intrusion= a rock formation caused by magma that cut through rock layers and then solidified.
Fault= a crack that cuts across rock layers and then allows them to offset due to tensional or compressional forces.

13. Create a T-chart showing what percentage of original material would be left in a rock sample after 0, 1, 2, 3, 4, and 5 half-lives.
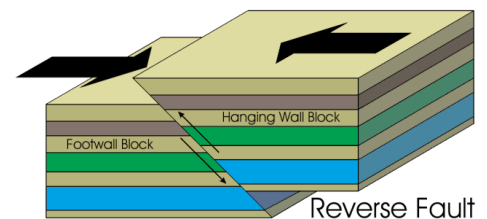
0	100%
1	50%
2.	25%
3	12.5%
4	6.25%
5	3.125%

14. If a substance has a half-life of 100 years and 12.5% of its original material is left, how old is it?
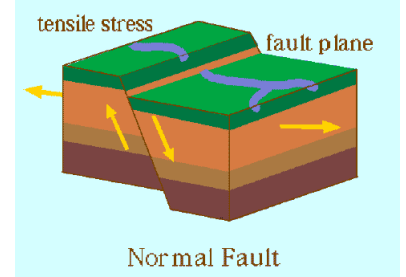300 years old

15. What kinds of forces cause reverse faults? Draw a picture of a reverse fault.
Compressional forces cause reverse faults.

Reverse Fault

16. What kinds of forces cause normal faults? Draw a picture of a normal fault.
tensional forces cause normal faults.

Normal Fault

17. What are some places where you would be likely to find limestone?
In deep water environments, coral reef environments, shallow sea environments

18. What kinds of depositional environments would have well-rounded sediments?
Environments with moving water (streams, rivers, beaches, ect)

19. What is some of the evidence in the rock record that shows when more or less oxygen is present in the atmosphere?
If Rusting has occurred on rocks, there is likely more oxygen. At some points in history, organisms were much larger also, partially due to more oxygen in the atmosphere.

20. If an igneous rock has very tiny mineral grains, did it likely cool inside the earth or at the surface? Explain.
It likely cooled at the surface, because mineral grains come together slowly, so if the grains are small, then the rock must have cooled quickly.

21. Explain what evaporite deposits are and how they form.
    Evaporite deposits are rocks made from the dissolved sediments left by large bodies of water after they've evaporated, such as salt deposits.

22. What kind of depositional environment would create coal, oil, and natural gas deposits?
    Swamps, forests, places where it is damp and cool or hot.

23. How do scientists use ice cores to tell about the past climate?
    Ice cores have pollen grains in them that can be used like index fossils to figure out when the ice core layers formed. The dissolved gases in them, especially CO2, can tell what the atmosphere was like in the past. more CO2 usually indicated higher temperatures. They can also tell about pollution in the ice, which may indicate human activity, volcanic eruptions, meteor strikes, ect.

24. What would higher levels of CO2 in ice sheets indicate about the climate when that ice was formed?
    Warmer temperatures.

25. How has human activity affected ice formation in the past? What evidence of this do we have in ice cores?
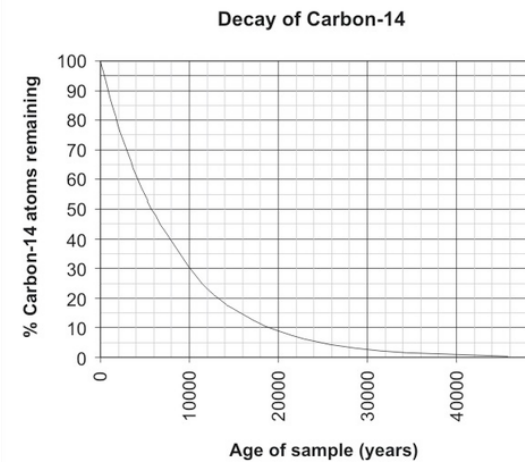   Greater amounts of pollution can be found in the ice cores when humans began burning fossil fuels. Also, human activity has led to the increased temperature of the atmosphere which has melted more ice cores.

26. How do we determine how old ice layers are?
    By using pollen fossils to correlate layers of the same age. (like index fossils)

27. How old would a sample be if it only has 60% of its original material? 40%? 20%? 5%?   2.5%?
60%= 4,0000   40%= 8,000   20%=13,000   5%=24,000
2.5%= 31,000

Decay of Carbon-14

% Carbon-14 atoms remaining (y-axis: 0 to 100)
Age of sample (years) (x-axis: 0 to 40000)

28. Put the order of events for the first rock diagram in order.
Include a letter U for the unconformity, and a letter X for the fault.
Oldest= IBFUXMHR=youngest
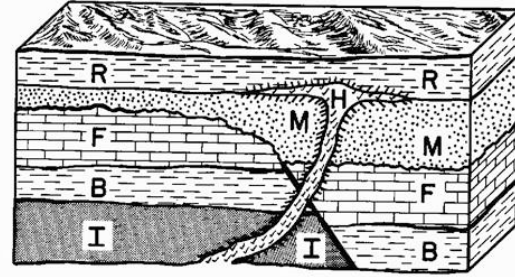
29. Tell the story for the first rock diagram as best you can.
Rock layer
Layer I was laid down flat, followed by B and F. Then Sea level rose
and eroded through layer F, causing Unconformity U. Then
tensional forces caused by a divergent plate boundary caused a
normal fault to cut across layers I B and F. Then layer M was laid
down flat on them. Volcanic activity cut across all these layers and the fault and unconformity,
creating igneous intrusion H. Finally, Layer R was laid on top of them all.

30. Put the order of events for the second rock diagram in order.
Include a letter U for the unconformity.
Oldest GFEDCUBA Youngest
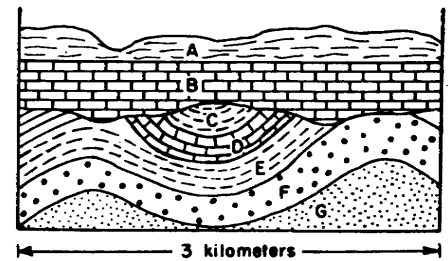
31. Tell the story for the second rock diagram as best you can.
Layer G was laid down flat, followed by F , E, D, and C. Then
compressional forces from a convergent plate boundary caused the
layers to fold. Sea level then rose and eroded the rocks, created
unconformity U. Then B was laid down flat on them, and finally A.

32. What kinds of fossils make good index fossils?
        1) Easily identified   2) found in a variety of locations   3) The species survived for a
short time period

33. What kinds of fossils make bad index fossils?
        1) you can't tell it apart from other species
        2) The organism isn't widespread and can't be found in many locations
        3) The species existed for a long time in history. It's found in many rock layers of the
same location.

34. Which layers (W-Z) of rock at the bottom could be shown to have the same ages as one
another? How do you know?

Using index fossils:
1. the top layer of W and the second from top Y
2. The top of X and bottom of Z
3. The bottom of X and top of Y
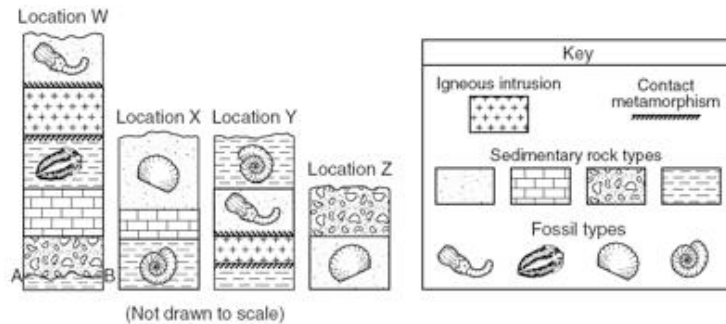
A   B   C   D

35. Which Fossils (A-D) are the oldest and which are the youngest in the bottom right diagram?
Explain. (See diagram above).
Fossil B is the oldest, then A, then D, and C is the youngest. If you correlate their layers, the
youngest has to be C because it is younger than D in outcrop X.
D is younger than A in outcrop Y.
A is younger than B in outcrop W.

36. Which of the rock layers below are the same age as one another?

B and D, C and F