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Please, read each question carefully before you answer. Each question has only one correct answer. Make sure your name is on the examination and the answer sheet when you finish.

1. The movement of lithospheric plates is described by ...
 - a. geology
 - b. tectonics
 - c. geophysics
 - d. plate tectonics

2. An oceanic trench is an example of a plate boundary
 - a. reduction
 - b. convergent
 - c. divergent
 - d. transform

3. Large earthquakes and explosive volcanic activity are associated with the following plate boundary:
 - a. transform
 - b. oceanic
 - c. island arc
 - d. subduction

4. A tsunami is most likely associate with the following:
 - a. transform fault boundary
 - b. island arc
 - c. earthquake in an offshore subduction zone
 - d. earthquake along the mid-oceanic ridge

5. How does the continental crust differ from the oceanic crust?
 - a. it is about the same
 - b. continental crust is lighter and richer in Si and Al
 - c. continental crust is more brittle
 - d. oceanic crust is thicker

6. Bowen's reaction series describes
 - a. the order of crystallization of silicate minerals from magma
 - b. reactivity of minerals with acidic solutions
 - c. reactivity of silicate minerals with hydrothermal fluids
 - d. all of the above

7. The following properties can be used to identify minerals in hand specimens
 - a. hardness
 - b. cleavage
 - c. streak
 - d. all of the above

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8. Plagioclase feldspar cannot scratch the following

- a. talc
- b. fluorite
- c. pyrite
- d. quartz

9. A light colored, coarse grained intrusive rock could be a granite if it

- a. has less than 10% Quartz
- b. is plutonic
- c. has more than 10% Quartz
- d. has some feldspar

10. The mineralogy of diorite corresponds to the following volcanic rock

- a. andesite
- b. dacite
- c. basalt
- d. gabbro

11. Lahar is a

- a. hot pyroclastic flow
- b. a debris flow containing predominantly volcanic debris
- c. an ash fall deposit
- d. a welded ash deposit close to the volcano

12. Bowen's reaction series can be used to explain the following

- a. mineral hardness
- b. order of physical weathering of silicate minerals
- c. order of chemical weathering of silicate minerals
- d. all of the above

13. Joints oriented parallel to the exposed rock surface are

- a. tectonic in origin
- b. formed by compression
- c. exfoliation joints
- d. cold joints

14. Acid mine drainage is caused primarily by

- a. weathering of granite
- b. oxidation of pyrite
- c. oxidation of pyroxene
- d. all of the above

15. The presence of CO₂ in rain water promotes

- a. chemical weathering

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- b. acid mine drainage
c. clay formation
d. clay solubility
16. Chemical weathering of iron pyroxene produces the following
a. hematite and dissolved silica
b. K^+ in solution and hematite
c. Fe^{+2} in solution and silica precipitate
d. Fe^{+2} in solution and clay
17. Deeply weathered rock which resembles the original rock in appearance is
a. residual soil
b. saprolite
c. bauxite
d. laterite
18. Deeply weathered saprolitic granite is a problem in construction because it
a. contains cores stones
b. the interface between unweathered rock and weathered material is irregular
c. forms steep slopes
d. it can be easily eroded
19. Which of the following is not a clastic sedimentary rock
a. sandstone
b. claystone
c. limestone
d. shale
20. Most common mineral in clastic sedimentary rocks is
a. mica
b. quartz
c. feldspar
d. calcite
21. Claystone can be differentiated from shale by the fact that shale
a. is finer grained
b. shale is harder
c. shale has fissility
d. none of the above
22. What is the engineering significance of bedding in sedimentary rocks
a. it can form a sliding plane
b. it is a type of discontinuity
c. it can form a barrier to water flow
d. all of the above

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23. Which of the following characteristics can be used to describe karst terrain

- a. sinkholes
- b. large springs
- c. internally drained valleys
- d. all of the above

24. Calcite has higher solubility when

- a. partial pressure of CO_2 is high and water is cold
- b. partial pressure of CO_2 is low and water is warm
- c. water is not flowing rapidly
- d. water is flowing rapidly

25. Which of the following is a non-foliated metamorphic rock

- a. schist
- b. phyllite
- c. bauxite
- d. greenstone

26. Which of the following minerals can be a problem if present along foliation planes

- a. graphite
- b. serpentine
- c. talc
- d. all of the above

27. The typical angle of friction for the minerals identified in question 26 can be

- a. 30 to 35 degrees
- b. about 20 degrees
- c. 30 degrees
- d. as low as 10 to 12 degrees

28. Which of these rocks has been subjected to the lowest degree of metamorphism

- a. biotite schist
- b. slate
- c. quartzite
- d. biotite gneiss

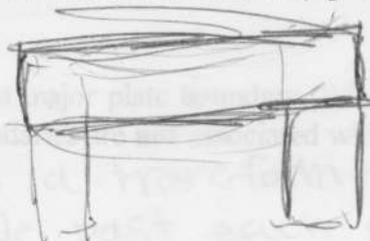
29. Along which part of a meander would you expect the highest rate of deposition

- a. on the inside just above the maximum bend
 - b. on the outside above the maximum bend
 - c. on the inside at and below the maximum bend
 - d. all of the above
- 

30. Increased erosion occurred downstream of a dam just after its completion. Could you have predicted this phenomenon

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- a. yes
 b. no
 c. not without many years of study
 d. none of the above
31. Cross-bedding and ripple marks can be used to find
 a. the direction of flow in an ancient stream
 b. velocity of the stream
 c. both a and b
 d. none of the above
32. Highly compressible organic rich deposits can be found
 a. on a flood plain
 b. in an oxbow lake deposit
 c. on a natural levee
 d. all of the above
33. The absolute age of rocks can be determined from
 a. position of adjacent rocks
 b. types of fossils
 c. dating using radioactive minerals
 d. all of the above
34. An angular unconformity is
 a. a depositional contact between two rock units
 b. a depositional contact between two rock units if there is a gap in deposition
 c. a depositional contact between two rock units at different orientations
 d. all of the above
35. Silica alkali reaction with cement is caused by the presence of the following mineral
 a. granite
 b. quartz
 c. chert
 d. feldspar
36. What rock property were the ancient stone masons careful about when they placed the lintel stone across the door way at
- a. tensile strength
 b. compressive strength
 c. weathering rate
 d. weight



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37. What is a dip slope and why might we be concerned about it in certain types (name them) of rocks?

A dip slope is a problem in rocks such as granite or serpentinite because it could lead to such problems as rockslides and rock avalanches.

38. Rank the following rocks in the order of their rapidity of weathering in a warm humid climate: granite, quartz rich sandstone, limestone. Explain your ranking.

- ① sandstone
- ② Limestone
- ③ granite

Sandstone would weather first in a humid climate due to the ~~moisture~~ moisture. Limestone would weather next due to the temperature and moisture. Granite is the hardest and would ~~weather~~ weather last.

39. What property(ies) control the erodability of sediment?

Chemical composition
water content
Climate
Pressure, (weight)?

40. Hayward Fault on the Berkeley Campus is a part of a major plate boundary. What kind of a boundary is it and what hazard(s) typical of plate boundaries are **not** associated with it?

The Hayward Fault is a transform fault where two plates slide past each other. Volcanic activity as well as lava flow or orogeny is not a ~~typical~~ typical hazard. ✓