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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. A phenocryst is
 - a. Another name for feldspar
 - b. A large crystal set in a matrix of fine-grained crystals
 - c. A polymorph of feldspar
 - d. None of the above
2. A glass plate can be scratched by the following mineral
 - a. pyrite
 - b. fluorite
 - c. gypsum
 - d. quartz
3. The rate of chemical weathering of silicate minerals increases as
 - a. A function of hardness
 - b. As their crystallization temperature decreases
 - c. As the number of bonds between silica tetrahedral decreases
 - d. All of the above
4. New lithospheric crust is typically produced
 - a. in subduction zones
 - b. at transformational boundaries
 - c. at spreading centers and mid-ocean ridges
 - d. beneath continents
5. A potentiometric surface describes
 - a. the permeability of an aquifer
 - b. the distribution of head in an aquifer
 - c. a transitional erosional surface
 - d. uplifted terraces on a floodplain
6. The mineralogy of gabbro corresponds to the following volcanic rock
 - a. Basalt
 - b. Dacite
 - c. Diorite
 - d. Rhyolite
7. The alignment of the Hawaiian Islands and Emperor Seamounts identify
 - a. a mid-ocean spreading center
 - b. a Plate boundary
 - c. a change in the direction of the Pacific Plate movement
 - d. all of the above

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100

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8. An igneous dike
- a. prevents water from flooding in the Sacramento/SanJoaquin River Delta
 - b. intrudes across country rock bedding
 - c. intrudes horizontally parallel to country rock bedding
 - d. none of the above
9. Cross-bedding in sedimentary rocks
- a. is an indicator of the direction of flow during deposition
 - b. provides a means of relative age dating of sedimentary layers
 - c. indicates that deposits formed in a beach environment
 - d. none of the above
10. The least durable cementing agent in clastic sedimentary rocks is
- a. clay
 - b. silica
 - c. feldspar
 - d. calcite
11. Laterite is
- a. a residual soil formed in warm humid climate
 - b. a term describing the leached zone in a soil profile
 - c. transported soil deposited in a warm humid climate
 - d. deeply weathered rock
12. The San Andreas fault is an example of this kind of plate boundary
- a. transform
 - b. oceanic
 - c. island arc
 - d. subduction
13. Saltation is a term describing
- a. excavation of halite from surface mines
 - b. transport of particles by bouncing along the stream bottom
 - c. movement of particles by rolling along the stream bottom
 - d. all of the above
14. Fractional crystallization describes
- a. melting behavior of portions of rocks and melts
 - b. evolution of mineral formation in a cooling magma chamber
 - c. evolution of extrusive volcanic rocks from an originally basaltic magma
 - d. none of the above

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15. Mt St. Helens in the state of Washington is a
- a. dome volcano
 - b. composite volcano
 - c. cinder cone volcano
 - d. shield volcano
16. Unconformities are important records of
- a. Large scale depositional events
 - b. Erosion and/or periods of tectonic uplift
 - c. Metamorphic activity
 - d. All of the above
17. Engineering problems encountered in shale rocks include
- a. swelling and slaking
 - b. high pressure and high temperature metamorphism
 - c. unstable cross-bedding
 - d. all of the above
18. The presence of CO₂ in rain water promotes
- a. chemical weathering
 - b. acid mine drainage
 - c. carbonate formation
 - d. clay solubility
19. 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
20. Exfoliation or sheet joints in granitic rocks are formed as a result of
- a. tectonic forces
 - b. formed by compression
 - c. cooling of magma
 - d. unloading and weathering
21. Which of the following is a clastic sedimentary rock
- a. greenstone
 - b. shale
 - c. saprolite
 - d. limestone

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22. Shale can be differentiated from claystone by the fact that
- claystone is coarser
 - claystone is softer
 - shale has fissility
 - none of the above
23. How are chert and limestone similar in origin
- they are both sedimentary rocks
 - they are both formed by biochemical and biogenic processes
 - they are amorphous
 - all of the above
24. Which of these rocks has been subjected to the lowest degree of metamorphism
- biotite schist
 - slate
 - quartzite
 - biotite gneiss
25. Karst terrain refers to
- regions where sinkholes are found
 - streams that appear and disappear
 - dissolution caves in a limestone formations
 - all of the above
26. What is one of the key causes of rock falls
- Rock bolting
 - freeze/thaw stresses in joints
 - rainfall-induced pore pressures
 - none of the above
27. Lithification is the process of
- sedimentary rock formation
 - compaction of sediment
 - cementation of sediment
 - all of the above
28. Which of the following are characteristics of a perched water table
- usually occurs at high elevations in dendritic river systems
 - can be confined by aquicludes
 - is disconnected from the continuous water table and sits on a low permeability layer
 - none of the above

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

- a. on the inside of the bend
- b. on the outside of the bend
- c. in a straight section of the channel
- d. all of the above

30. The absolute age of rocks can be determined from

- a. position of adjacent rocks
- b. types of fossils
- c. dating using radioactive isotopes
- d. none of the above

31. Briefly describe the concept of Uniformitarianism. (1 point)

+1
Uniformitarianism is the concept that what is happening geologically now happened geologically in the past. For instance, erosion has been happening throughout history, not just in the last 10 years.

32. A large rotational landslide has just moved and has cut off access to your street in the Oakland Hills (though your house is safe). List 3 techniques that can be considered for stabilizing this landslide mass from moving again. (3 points)

+3
Drainage - relieve pore pressure.
Add more mass at the bottom of the slide.
Take loads off the top of the slide

33. Rank the following rocks in the order of their rapidity of weathering in a warm humid climate: granite, limestone, and gabbro. Explain your ranking. (2 points)

HPD
+1
limestone
- 100
- 1000
granite - high silica - felsic
- gabbro - mafic - low silica

High silica materials are most resistant in warm humid climates.

↑ fast
gabbro
↓ limestone
granite

↓ slow (faster)
granite - Quartz
gabbro
limestone - CaCO₃

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34. Granitic rocks are among the strongest rocks encountered. What feature of such a rock mass has the greatest influence on the stability of rock slopes? (2 points)

+0
The feature is the interlocking method of the minerals that make up the rock. It's like a jig saw puzzle and all the spaces get filled by the right shape, making the rock extremely strong and stable.
↳ joints & fractures.

35. Identify two primary differences between oceanic crust and continental crust. Please explain your answers. (2 points)

+1
Composition: Oceanic crust is mostly basalt, continental crusts vary.
Oceanic crusts tend to go under continental crusts, forming subduction zones and a place to form new rocks.

(chemical compositions differ)

Also, oceanic crust is thinner

