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American University of Beirut  
Final Examination

Department of Geology  
Physical Geology (201)  
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June 10, 2000  
Time; 2 hours  
Exam rules apply

PART I

Answer all questions in Part I (multiple-choice questions) on worksheet  
1. Select only one answer for each question; note that for each question: correct answer = (+1.5 mark); incorrect answer = (-0.5 mark).

1. Peridotite is an igneous rock that forms from a magma which is:  
A. felsic  
B. intermediate  
C. mafic  
D. ultramafic  
E. silicic
2. Pyroclastic texture is best seen in a rock called:  
A. ignimbrite  
B. granite  
C. obsidian  
D. basalt  
E. schist
3. Glassy texture characterizes this rock:  
A. ignimbrite  
B. granite  
C. obsidian  
D. basalt  
E. schist
4. An example of a clastic sedimentary rock is:  
A. marble  
B. breccia  
C. chert  
D. limestone  
E. diorite
5. Shale is considered to be an example of:  
A. Chemical sedimentary rock  
B. Biochemical sedimentary rock  
C. clastic sedimentary rock  
D. mafic igneous rock  
E. felsic igneous rock
6. Amphibole is an example of:  
A. single chain silicates  
B. double chain silicates  
C. sheet silicates  
D. tectosilicates  
E. cyclosilicates
7. In tectosilicate structures, each tetrahedra shares the following number of its oxygens with neighbouring tetrahedra:  
A. one  
B. two  
C. three  
D. four  
E. five



8. A mineral example of single chain silicates is:  
A. quartz  
B. biotite  
C. pyroxene  
D. K-feldspar  
E. olivine
9. Olivine is a mineral that is most common in the:  
A. the continental crust  
B. the oceanic crust  
C. the mantle  
D. the core
10. According to Bowen's reaction series, the following silicate mineral crystallizes from a melt first (at high temperature):  
A. quartz  
B. biotite  
C. pyroxene  
D. K-feldspar  
E. olivine
11. The asthenosphere occurs within the:  
A. the continental crust  
B. the oceanic crust  
C. the upper mantle  
D. the lower mantle  
E. the core
12. The thickness of the earth's mantle is about:  
A. 90 km  
B. 900 km  
C. 1900 km  
D. 2900 km  
E. 3900 km
13. The age of the boundary between the Cenozoic and the Mesozoic is:  
A. 65 Ma  
B. 245 Ma  
C. 544 Ma  
D. 2500 Ma  
E. 2900 Ma
14. The Pliocene is an epoch of the following Era:  
A. Proterozoic  
B. Archean  
C. Paleozoic  
D. Mesozoic  
E. Cenozoic
15. A fold with a horizontal axial plane is known as:  
A. similar fold  
B. overturned fold  
C. zig-zag fold  
D. recumbent fold  
E. plunging fold
16. The scientific term for a fracture along which no apparent movement has occurred is:  
A. strike  
B. anticline  
C. thrust  
D. fault  
E. joint
17. Which of the following statements about synclines is true?  
A. The oldest rocks occur in the center and the limbs dip toward the center  
B. The oldest rocks occur in the center and the limbs dip away from the center  
C. The youngest rocks occur in the center and the limbs dip away from

the center

D. The youngest rocks occur in the center and the limbs dip toward the center

18. What type of tectonic forces causes folding?  
 A. compressional forces                      B. tensional forces  
 C. compressional and tensional              D. shearing forces  
 E. transform forces
19. Which type of fault that shows the hanging-wall displaced downward with respect to the footwall?  
 A. reverse fault                                      B. thrust fault  
 C. both reverse and thrust                      D. normal fault  
 E. oblique slip fault
20. What is the name of the Mesozoic supercontinent that consisted of all of the present continents?  
 A. Eurasia    B. Laurasia  
 C. Pangaea    D. Gondwanaland  
 E. Pan-Africa
21. Particles that roll and slide along the river bottom are called:  
 A. drift load    B. suspended load  
 C. bed load    D. loess  
 E. outwash deposits
22. Large cone-shaped deposits of stream sediments at a mountain front are called:  
 A. deltas    B. alluvial fans  
 C. natural levees                                      D. desert pavements  
 E. moraines
23. The type of drainage network that characterizes regions containing fractured crystalline bedrocks is called:  
 A. rectangular drainage                              B. radial drainage  
 C. dendritic drainage                                      D. annular drainage  
 E. trellis drainage
24. The coarse, gravelly ground surface that results from the removal of fine-grained particles by wind erosion is called?  
 A. loess    B. alluvial fan  
 C. pediment    D. desert pavement  
 E. lateral moraine
25. Sand will accumulate on the:  
 A. leeward side (downwind) of a boulder  
 B. windward side (upwind) of a boulder  
 C. equally on the leeward and the windward side of a boulder  
 D. neither the leeward nor the windward side of a boulder

26. Streamlined asymmetrical hills composed of till and deposited by a glacier is a description of:
- A. moraines
  - B. eskers
  - C. kames
  - D. outwash deposits
  - E. none of the above
27. Exfoliation is an example of:
- A. oxidation
  - B. glacial erosion
  - C. wind erosion
  - D. chemical weathering
  - E. physical weathering
28. Which of the following statements is false?
- A. mafic magmas are more viscous than felsic magmas
  - B. mafic magmas are hotter than felsic magmas
  - C. mafic magmas contain more iron than felsic magmas
  - D. mafic magmas contain less silica than felsic magmas
29. Which of the following pairs of intrusive and extrusive rocks have the same chemical composition?
- A. picrite and basalt
  - B. andesite and basalt
  - C. diorite and basalt
  - D. gabbro and basalt
  - E. syenite and basalt
30. An accurate description of an igneous rock containing 1 cm long plagioclase crystals in a fine grained matrix of 0.1 mm crystals is:
- A. porphyritic
  - B. plutonic
  - C. volcanic
  - D. ignimbritic
  - E. glassy
31. What is the name for soils that are rich in Ca:
- A. geocals
  - B. pedocals
  - C. bauxites
  - D. evaporites
  - E. laterites
32. The main rock type of the oceanic crust is:
- A. basalt
  - B. granite
  - C. rhyolite
  - D. syenite
  - E. granodiorite
33. Solifluction may occur when:
- A. the surface soil layer freezes while the deeper soil remains unfrozen
  - B. the surface soil layer thaws while the deeper soil remains frozen
  - C. the surface soil layer and the deeper soil both freeze
  - D. the surface soil layer and the deeper soil both thaw
34. The groundwater table lies at:
- A. the top of the unsaturated zone
  - B. the top of the saturated zone
  - C. the base of the saturated zone
  - D. the sea level
  - E. the boundry between altered bedrock and soil

35. Which of the following combinations make for the best groundwater reservoir?
- A. low permeability and low porosity
  - B. low permeability and high porosity
  - C. high permeability and low porosity
  - D. high permeability and high porosity
  - E. high recharge and low permeability

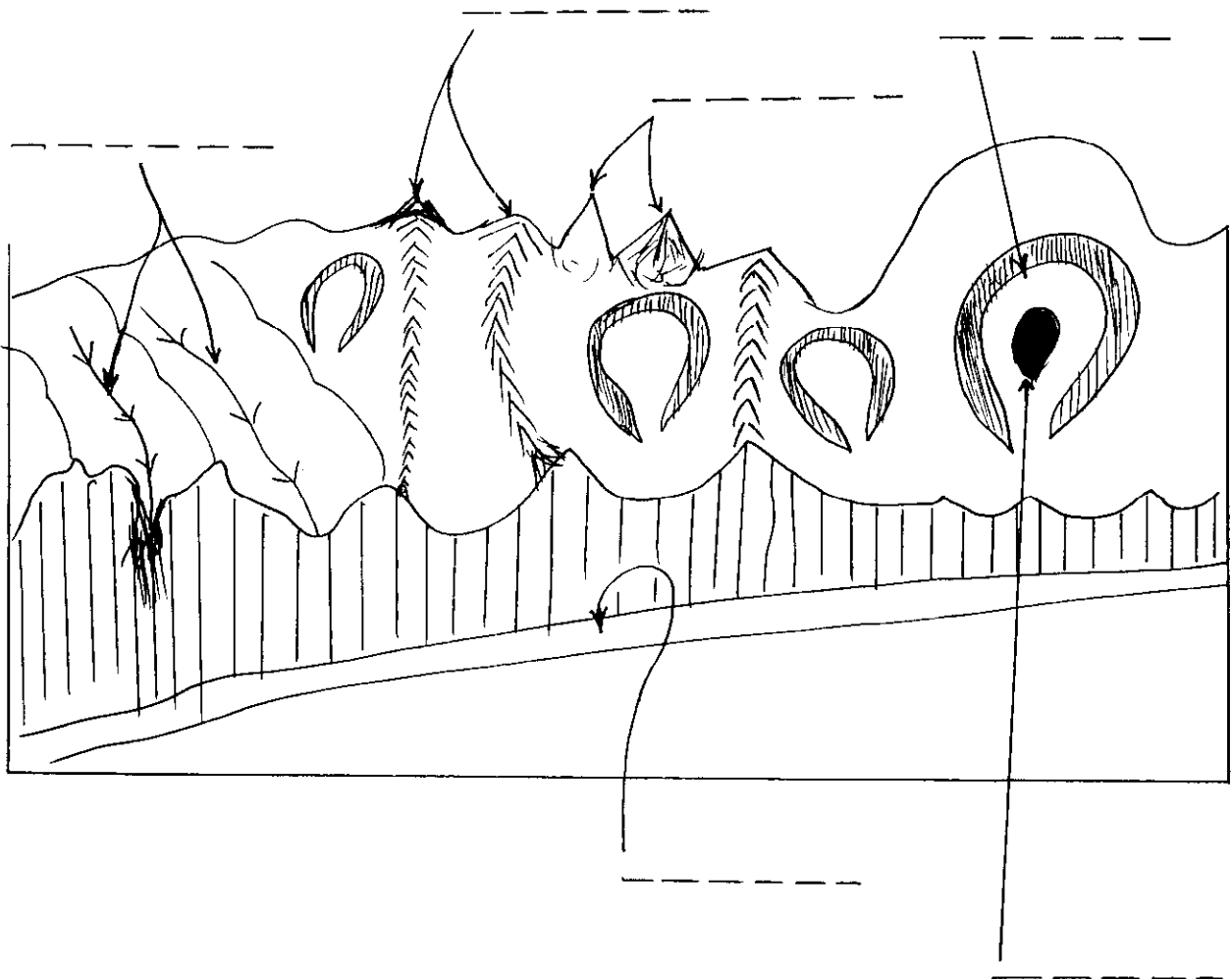
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**PART II**

Label (directly on the diagrams provided below) the components of the various geological features:

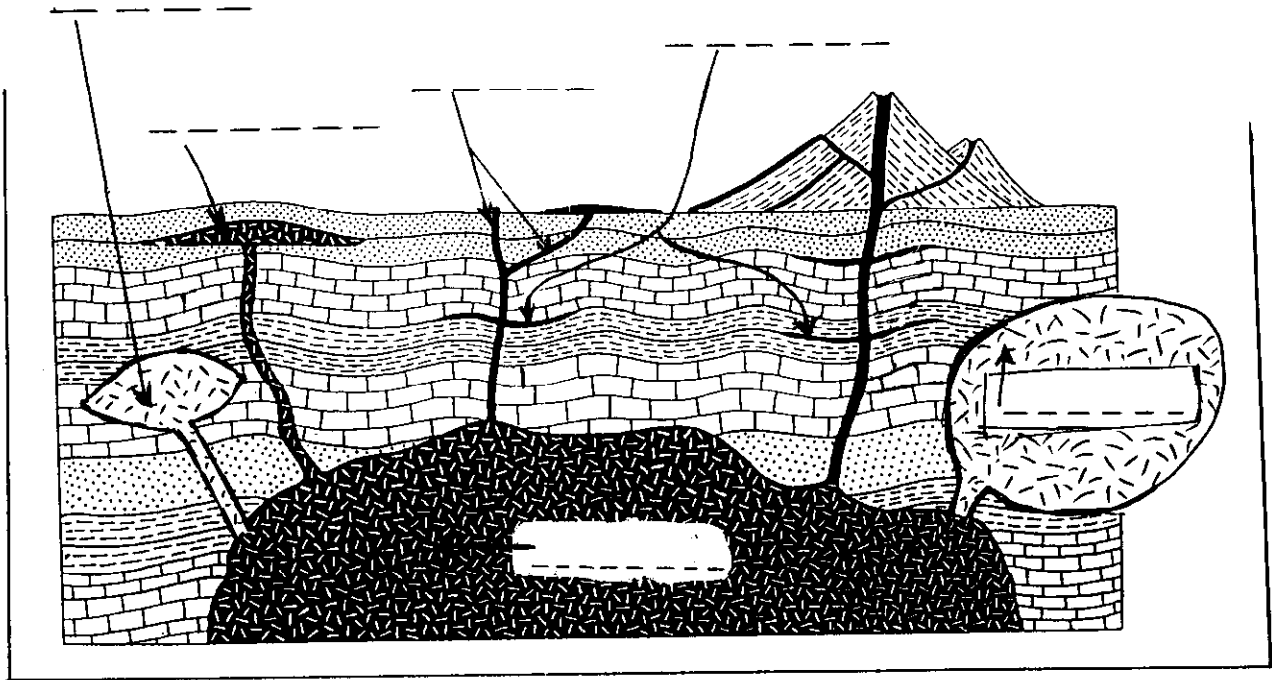
(Marks)

- (5) II-A. Label the Erosional features of glaciers;

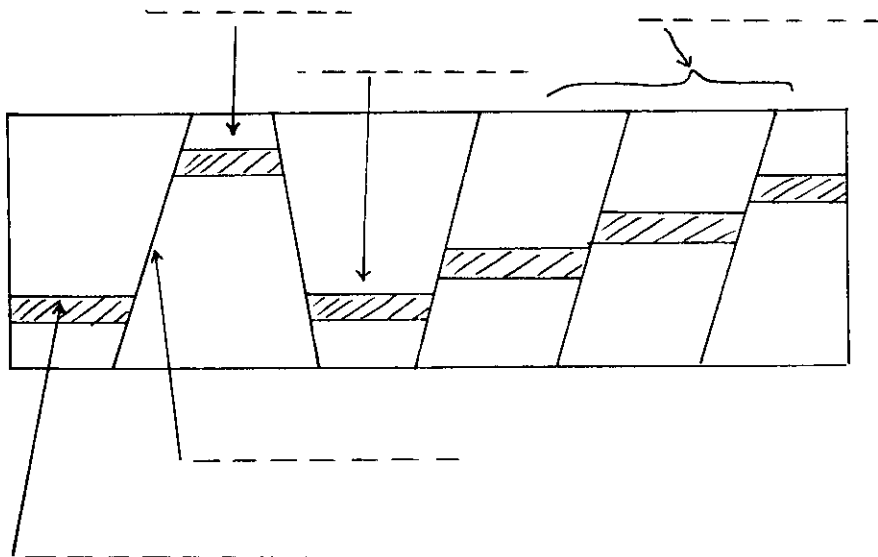


(Marks)

(5) II-B. Label the various igneous rock forms;



(5) II-C. Label the various components of a fault system;



## PART III

Answer only **TWO** of the following three questions in Part III

(Marks)

- (15) III-1. In a Table format, compare and contrast the Thermal (contact) and the regional metamorphic rocks. Use a diagram to illustrate such contrast and to show where do these rocks form at Earth. Name three thermal metamorphic rocks, and name four regional metamorphic rocks indicating the grade of metamorphism (very low, low, medium, high) at which each of the four rocks form.

(Marks)

(15) III-2. Describe in detail the various types of "Convergence" along plate margins, indicating the geological features associated with each type, and give examples (use fully labelled diagrams, along with text to illustrate your answer).



(Marks)

- (15) III-3. Write an essay on the rock (geologic) cycle: use fully labelled diagrams, along with text to illustrate your answer.
- List seven evidences in support of the plate tectonic theory.

Have A Good Summer