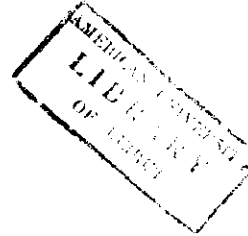


DEPARTMENT OF GEOLOGY
American University of Beirut



FINAL EXAMINATION



GEOMORPHOLOGY
(G-210)

This examination is made of **Four Parts** in eight pages including the covering page. Each part begins with certain relevant instruction to abide by. Be careful in reading and answering as eventually everything will count.

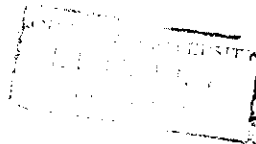
Do not forget to write your name on this page. It is also worth checking the number of parts and pages of the examination in the booklet before and after answering the questions. Remember that any lacking page or answer will be on your responsibility.

Date: February 10th, 1998

Name: _____

Time: From 11 a.m. _____ To 12:30 p.m. Student No: _____

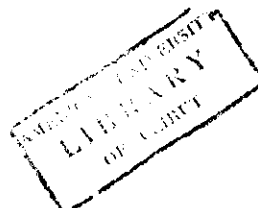
N.Aker



Part I
QUESTIONS
(35 MARKS)

Answer the following questions briefly. Note that expansion by additional material may count against you.

1. What is the drainage pattern type in figure 1. Give the order of the different segments in the drainage system by using Strahler system of ordering.
2. Put down the names of the geomorphological forms in the figures 2-4.
3. What are the differences between (answer 5 only):
 - entrenched and ingrown meanders
 - granular exfoliation and peeling
 - tors and cores
 - perascensum and descensum
 - drainage density and drainage frequency
 - channel bars and channel islands
 - barchanoid and barchan dunes.
4. Write an essay on the wave refraction and through the understanding of its effect on a submerged shore features show the successive steps of the coastal geomorphic cycle.
5. Use the Coulomb-Terzaghi shear strength equation $S=C + \sigma \cdot \tan \phi$ in drawing sketches for the soil when it:
 1. Includes sand and clay
 2. includes only clay
 3. includes only sand.



Part II
True-False
(20 marks)

Mark the accurate statement with T and the wrong one with F. Do not mark with T and F combined together like T. Such a marking will not be considered at all.

1. Wave water that moves up the shore is called swash and when it returns to sea it is called backwash.
2. The unconsolidated material that is transported and deposited on slopes is called taluvium, when composed of large rock fragments.
3. Rock undergoes dilation due to pressure release as the overburden is eroded.
4. Cambering involves patterned ground like stone nets
5. Plasticity index is equal to liquid limit minus plastic limit.
6. The Karst features larger in dimensions than pits and honeycomb are called tafoni
7. A main valley along a fault is a fault valley.
8. A composite scarp is originally a fault scarp followed by renewal of faulting.
9. The dreikanterers are three facet pyramid-shaped ventifacts.
10. Capillary saturation is a zone of groundwater which exists immediately above the water table.
11. The equilibrium solubility of CO₂ is directly proportional with the fluid-temp.
12. Chelating agents through decomposition of carbonates in soil form desert varnish.
13. Higher clay percentage in the soil leads to increasing of the angle of cohesion and lowering of the angle of friction.

14. Antecedent valleys are valleys that antedates the rise of the base level (sea level)
15. A Cuesta has usually a backslope reaching up to 15° and a steep front slope.
16. Adjacent alluvial fans when grow and coalesce form bajada.
17. Levee are fluvial deposits which extend across the backswamp deposits.
18. The regolith that preserves the original bed structure forms pallid zones.
19. Organic processes usually produce vertical karst features called bio karst.
20. Yardang develop in desert soft and hard rock as large grooves.

Part III
Fill in Blanks
(30 marks)

Fill in the blanks the appropriate word(s) required. If the answer requires more than one word put them down in the right order.

1. _____ is a type of dolines specified by the collapse of noncalcareous overlying unit into a void in the underlying limestone beds.
2. The slides which have planar shear surface are called _____ but called _____ having the shear plane concaving up.
3. _____ are formed by intersecting prevailing bidirectional wind thus have two slip faces. When they become sinuous with a sharp crest they are called _____.
4. The sudden transition of river flow from supercritical to subcritical causes _____.

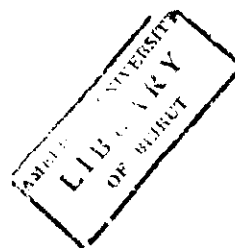
5. _____ are valleys formed where the river courses cross a feeding area then cut through limestone area then continue out of it.
6. The _____ are triangular depositional forms with the apex extending offshore. When are elongated and attached at one end to the main land they are called _____.
7. The _____ are major coral reefic forms which are separated from the mainland by deep channels.
8. The drainage pattern which has the primary tributaries join the main stream at right angles while the secondary ones are parallel to it, is called _____.
9. Upward movement of a fault -forming scarp downstream will create a _____. If the downward fault movement is downstream a _____ will be formed. A succession of the last features will be called _____.
10. During the water flow, the river concave bank is eroded and the convex bank receive deposits forming _____ deposits.
11. A graben when levelled by erosion, then uplifted and differentially eroded the form resulted which is opposite to the original form, is called _____.
12. Star - shaped dolines when individually surrounded by a polygonal pattern of ridges form what is called _____.
13. The river valley is called _____ as the sinkhole existing in the channel led to lowering of the upstream segment, and formation of a cliff on the other side of the sinkhole, down steamwards.
14. One of the explanations about the accumulation of coarse deposits or, _____ deposits, in the desert is that those deposits remain after blowing away of the fine material.

15. Isolated vegetation generate localized sand accumulations which taper downwind, known as _____.
16. When duricrust develops at low points in a landscape it will protect them from the denudational processes which eventually lower the originally higher surroundings below the level of the duricrust forming what is known as _____.
17. Bank calving process along river banks, due to under-cut, results in _____ which includes rotation of the rock block just as it falls away.
18. A fall in base level gives rise to a _____ which represents a discontinuity in the longitudinal profile of the channel slope.
19. River terraces are called _____ when incision is rapid and lateral shifting is negligible.
20. _____ are small rugged islands which become covered with seawater during high tide.

**Part IV
Matching
(15 marks)**

Match the geomorphological terms of the left column with those of the right column, or vice versa. Each item whether here or there must be used only once.

- | | |
|------------------------------|---------------------------------|
| 1. offset drainage | a. isolated residual hills |
| 2. anabranching | b. stalactites |
| 3. plunge pools | c. rip currents |
| 4. crevasse - splay deposits | d. eolian fine-grained deposits |
| 5. stream piracy | e. base level |
| 6. speleothems | f. reef forms |



7. drowned valleys
 8. Reynolds number(Re)
 9. Saltation
 10. inselberge
 11. plunging breakers
 12. stacks
 13. Atolls
 14. Magots
 15. loess
- g. karstified limestone landscape
 - h. strike-slip faulting
 - i. braiding
 - j. back swamp zone
 - k. coastal landforms
 - l. waterfalls
 - m. wind gap
 - n. Wind transportation
 - o. hydraulic radius

Good Luck

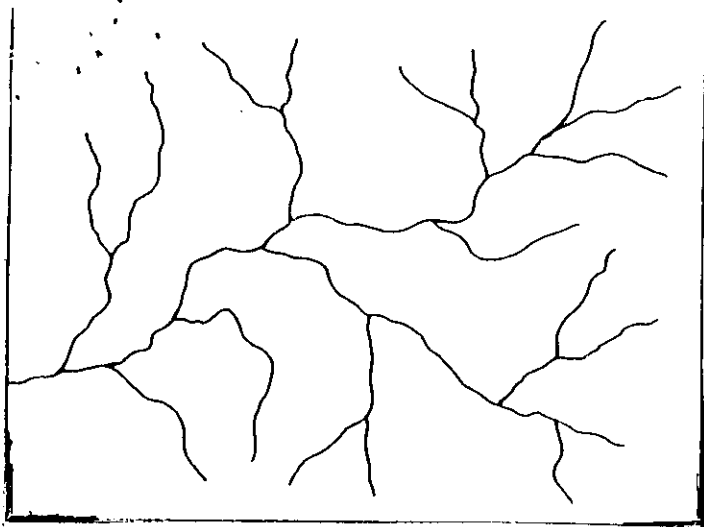


Fig. 1

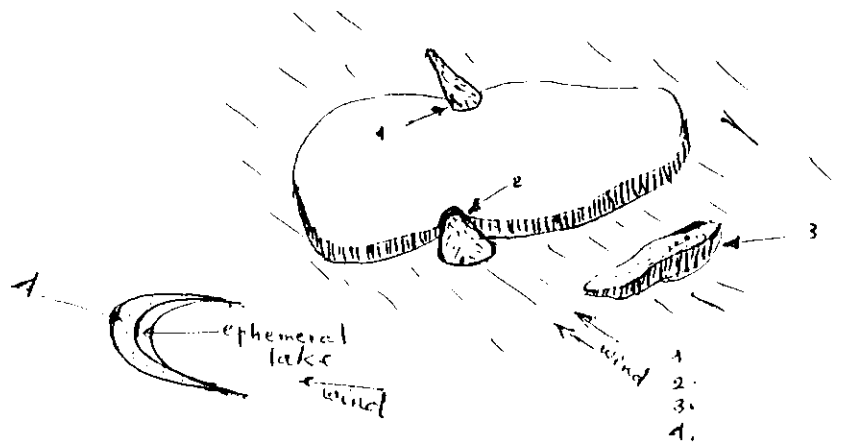


Fig. 2

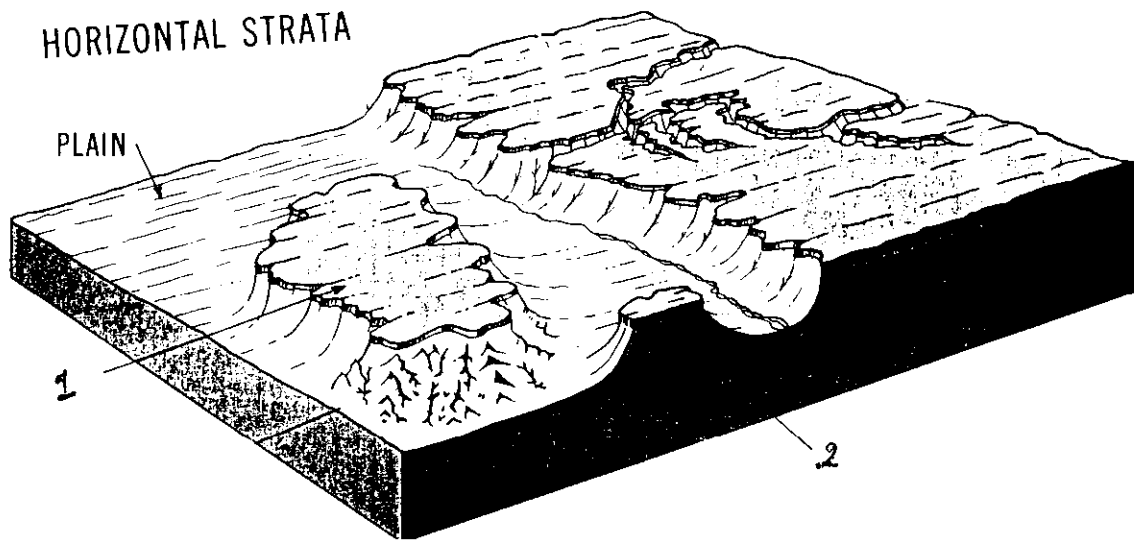
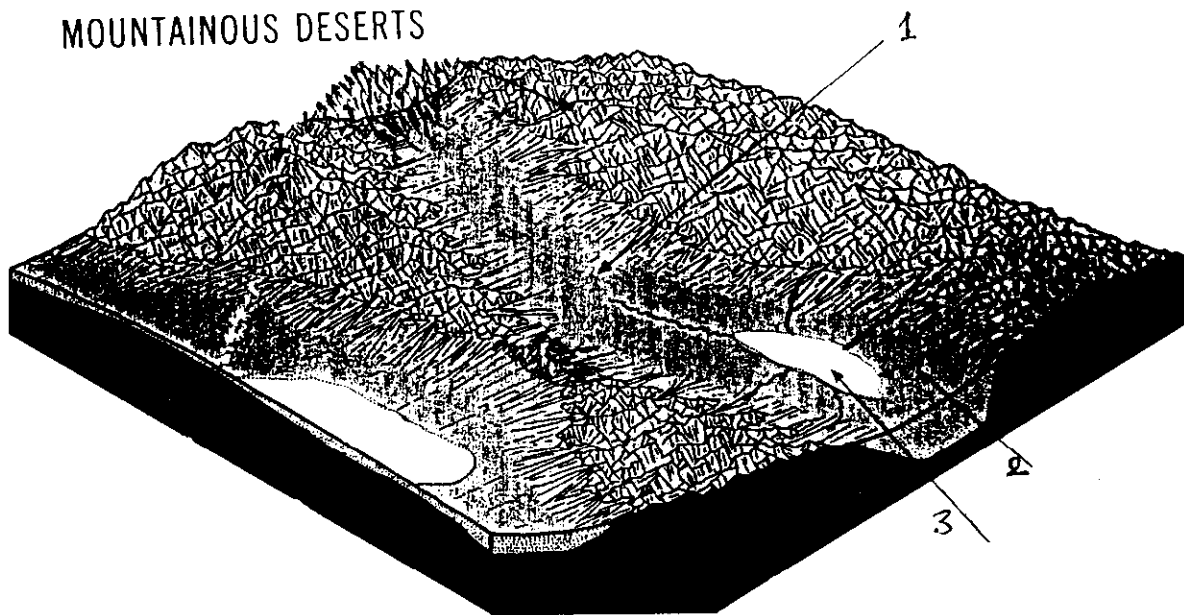


Fig. 3



Pattern

Fig. 4