



AMERICAN UNIVERSITY OF BEIRUT
Geology Department
Geol 210
Final Exam



February 5, 2000

Student Name: _____

Part I. Circle T = true or F = false and explain why if it is false (60 pts.)

T F 1. Weathering occurs through complex interactions between the lithosphere, atmosphere, hydrosphere and biosphere and gives rise to three major products: compounds in solution, creation of new minerals and original rocks broken into smaller particles.

T F 2. Eh (redox potential) is predominantly positive in weathering environments, but under water table and water logged soils oxidizing conditions can prevail.

T F 3. The interface between weathered and unweathered bedrock is known as the weathering profile.

T F 4. Hydration weathering (one type of physical weathering) that occurs through wetting and drying, causes expansion and contraction.

T F 5. Salt weathering is most active in arid environments where rates of evaporation are high relative to precipitation, but it was also observed in Brazil.

T F 6. Laterites (duricrusts) are iron and aluminum rich weathering deposits while bauxites are deposits containing economically extractable concentrations of aluminum.

T F 7. When subject to the same stress, different soils with identical moisture content may fail by brittle fracture, deform plastically or behave as a viscous fluid.

T F 8. The safety factor "F" is the ratio of the total amount of shear stress " τ " to the total shear strength "S".

T F 9. Where the intensity of precipitation exceeds the infiltration capacity a proportion of the precipitation will flow over the surface as saturation overland flow.

T F 10. The rate of erosion is a function of: erodibility (resistance of slope materials to entrainment and transport) and erosivity (the potential of slope processes to cause erosion).

T F 11. Ephemeral stream channels are occasional flows after storms in arid environments.

T F 12. In humid environment, hydrographs show a relatively constant discharge, termed base flow and upon storms they show rising limb termed storm hydrograph.

T F 13. Corrosion is the chemical weathering of minerals and the maximum rates of erosion are achieved where slow flowing, oversaturated water pass over rocks.

T F 14. Catchment areas or watersheds are areas, within which water supplied by precipitation is transferred to the ocean, they are separated by drainage divides.

T F 15. The meander wavelength is commonly about 10 times the channel width and about 5 times the mean radius of curvature.

T F 16. For the majority of rivers, where seepage losses and evaporation are not significant, the discharge, width and depth increase downstream, whereas velocity might increase or decrease depending on specific channel conditions.

T F 17. Point-bar deposits are ridges lying on the banks and running parallel to the river channel, they rise to a height of several meters above the level of the flood plain.

T F 18. The vertical variation of wind speed above the ground is significant; close to the surface wind speeds are at maximum.

T F 19. A doubling of wind velocity, will produce three fold increase in drag.

T F 20. Ripples are asymmetric in cross section with windward gentle slopes and steeper slope on the lee side.

T F 21. Barchans are dunes with two, more or less, opposing slip faces.

T F 22. Heat to glacier ice is supplied from: solar radiation, incorporation of warmer firm, geothermal heat and frictional heat by sliding.

T F 23. The discharge of glacier flow is generally highest around the equilibrium line, below which it decreases progressively down glacier.

T F 14. Crushing and fracturing (glacial erosion) involves the scratching, grooving and polishing of bedrock producing striations and rock floor.

T F 25. Subglacial transport is absent in ice sheets, whereas supraglacial transport is absent in valley glaciers.

T F 26. Wind-generated waves are created by a transfer of energy from moving air to a water surface. They depend on the velocity, duration and height of the wind.

T F 27. Tsunami (seismic sea waves) are generated by winds of very high speed. They travel at a velocity of more than 500 km/hr.

T F 28. Where a coast is formed by steep cliffs, which plunge straight into deep water, waves are reflected with little loss of energy and therefore without geomorphic work.

T F 29. Deltas are preferentially developed in the humid tropics and poorly developed in coastal environments of mid-latitudes.

T F 30. For long-term climatic change, information is acquired from the changing distributions of the fossils of plants and animals and from rock types, which are attributable to particular climatic regimes.

Part II. Answer only four of the following six questions (40 pts.)

1. Define and discuss solution and hydrolysis as two processes of chemical weathering.
2. Indicate and discuss factors determining the strength of slope materials
3. Define the stream segment, bifurcation ratio and drainage density and draw two schemes representing stream order of Shreve and Strahler
4. Discuss erosional aeolian landforms including small-, intermediate-and large-scale dorns, draw schemes.
5. Introduce the mechanisms of glacial deposition, draw schemes.
6. Discuss the significance of climatic change on geomorphology.

GOOD LUCK