



FINAL EXAMINATION - 2005 / 06

Time Allowed: Three Hours

Index No.

Date: 2006 - 03 - 15 (Wednesday)

Time: 0930 - 1230 hrs

The paper consists of two parts, Part A and Part B. Please detach Part A and submit with your answer script at the end of the examination.

Part A

Part A consists of Fourteen (14) questions.

Answer All Questions in the spaces provided.

You are advised to allocate 50 minutes for Part A.

1. Show the layering of planet earth by using a sketch. (2 points)
2. Give reasons why volcanic igneous rocks are glassy to fine textured. (2 points)
3. Both cleavage and crystal form are characteristic mineral properties. Give any two mineral examples for identifying two minerals using cleavage and crystal form. (2 points)
4. Differentiate between acidic and basic igneous rocks. (2 points)

5. Give origin of following rocks: (whether sedimentary, metamorphic or igneous) (2 points)

Granite
Sandstone
Marble
Slate

6. The engineers find sedimentary rocks are weakest material in comparison to igneous and metamorphic in Civil engineering construction works. Explain why sedimentary rocks are weaker in relation to other types of rocks. (2 points)

7. Define joints in rock mass and explain how the presence of joints in the bedrock of a dam foundation affect the stability and water tightness. (2 points)

8. Describe why meanders form in a river flowing along a flood plain using a sketch. (2 points)

9. Distinguish between a syncline and an anticline in a folded rock strata using a diagram. (2 points)



10. Bore holes are used during detailed engineering geological site investigation. List the information that should contain in a borehole log. (2 points)

11. An aquifer is a body of permeable rock or sediment through which ground water moves and stores. Using a cross - section of subsurface geology, show the existence of wells with artesian water levels. (2 points)

12. Give the type of engineering geological information that is required to assess the feasibility of a project and plan and design the foundation. (2 points)

13. Discuss the suitability of sedimentary rocks as foundation materials for dams. (2 points)

14. Exfoliation weathering caused splitting of rock mass in the Sigiriya Rock. Explain this statement from the point of view of weathering. (2 points)



Part B

The paper consists of 6 questions.

Answer Four (4) questions

Q1.

- (i) Explain the Geological Column and name the units of the geological time scale. (06 points)
- (ii) Write a brief account on Lithosphere and Asthenosphere. (06 points)
- (iii) Explain what fossils are and discuss the use of fossils in the study of sedimentary rocks. (06 points)

Q2.

- (i) Different textures are available in igneous rocks due to the different rates of cooling. State four different types of textures found in igneous rocks and describe any two of them in detail. (4.5 points)
- (ii) Write a short account of foliated and non-foliated metamorphic rocks. (4.5 points)
- (iii) The conversion of sand sediments to sandstone, which is a sedimentary rock, involves various steps. State the various steps that are involved in the conversion and discuss them. (4.5 points)
- (iv) The characteristic noticeable feature, which gives conspicuous appearance to sedimentary rocks, is called its structure. State four different structures that could be found in sedimentary rocks and discuss in detail two of them. (4.5 points)

Q3.

- (i) Write short notes on the following highlighting their specific geological characteristics with sketches.
 - a. Normal faults (3.5 points)
 - b. Unconformities (3.5 points)
 - c. Monoclines (3.5 points)
 - d. Columnar joints (3.5 points)
- (ii) In describing the attitude of planar features geologists have found it convenient to use special terms; dip and strike. Define dip and strike with reference to a layered rock. (4 points)

Q4.

- (i) The rate of chemical weathering of rocks depends upon several factors. Briefly describe the factors. (6 points)
- (ii) The Granite consists of feldspars, quartz and biotite mica as primary minerals. Explain what secondary minerals and end products are expected due to chemical weathering. (4 points)



- (iii) Briefly describe the factors that contribute to the soil formation process. (4 points)
- (iv) Explain how lateritic soils are formed which is very common in the southwest coastal belt of Sri Lanka. (4 points)

Q5.

- (i) An aquifer is a body of permeable rock or sediment through which ground water moves and stores.
 - a. What is ground water? (3 points)
 - b. Describe the ways in which pollution of ground water occurs. (4.5 points)
 - c. With the use of a diagram hydrologic cycle explain how ground water collects in an underground reservoir. (4.5 points)
- (ii) Show important features of a deltaic environment using a suitable sketch. (6 points)

Q6.

- (i) A layer of 2m thick weak soil was detected in a subsurface drilling of a site proposed to build a housing scheme. It was decided to have a geotextile as a ground improvement technique.
 - a. What problems would you expect if weak soils were present in the subsurface of a site? (4.5 points)
 - b. Explain how a geotextile would improve the weak soils in the site. (4.5 points)
 - c. Suggest and explain an alternative method to be used in the given site for ground improvement. (4.5 points)
 - d. Discuss why engineering geological investigation is essential in civil engineering constructions. (4.5 points)

