

The Open University of Sri Lanka

B.Sc. Degree Programme (Level – 05)

PHU 3257 – Essentials of Geology



Final Examination 2008/09

Date : 22nd July 2009

Time Allowed: 3 hours (1.30-4.30)

Paper consists of Nine (09) questions. Answer *FIVE (05)* questions selecting at least *ONE (01)* question from each of the sections **A**, **B** and **C**. Answers should be illustrated with sketch maps and diagrams where appropriate. Each question is allocated 20 points, and the marking scheme is given in *italics*

SECTION A- Earth Processes

1. (i) Write a brief note on the internal structure of the Earth as revealed by seismological evidences. *(5 points)*
- (ii) Compare and contrast the oceanic crust and the continental crust. *(5 points)*
- (iii) What causes the plates to move? *(5 points)*
- (iv) Explain the term 'Sea Floor Spreading' using the concept of plate tectonics. *(5 points)*

2. What geological factors would have been most influential in developing the following landforms found in Sri Lanka?
 - (i) Horton Plains *(4 points)*
 - (ii) Diyaluma Falls *(4 points)*
 - (iii) Sigiriya *(4 points)*
 - (iv) Piduruthalagala Mountains *(4 points)*
 - (v) World's End *(4 points)*

- 3 (i) Why are rocks vulnerable to weathering? *(4 points)*
- (ii) Describe the following weathering processes: *(4 points each)*
 - a) Frost Wedging
 - b) Exfoliation
 - c) Hydrolysis
 - d) Carbonation



SECTION B – Earth Materials

4. (i) What do the terms euhedral, subhedral, and anhedral mean in describing a mineral's shape? (4 points)
- (ii) What do you mean by "hardness" in mineralogy? (4 points)
- (iii) Write a note on oxide minerals. (4 points)
- (iv) What are 'evaporite deposits'? Name two minerals of economic importance that are typically associated with "evaporite" deposits. (4 points)
- (v) What are the differences and similarities between ruby and sapphire (4 points)
5. (i) How do you define plutonic and volcanic igneous rocks? (5 points)
- (ii) *'Most of the world's largest mineral resources are associated with igneous rocks'*. Justify this statement giving appropriate examples. (5 points)
- (iii) Describe the classification of foliated metamorphic rocks. (5 points)
- (iv) How do degree of sorting, roundness, and sphericity of grains change with increasing distance of transport. (5 points)
6. (i) List sedimentary, igneous and metamorphic units in Sri Lankan crust? (5 points)
- (ii) Describe the method used to classify metamorphic rock units of Sri Lanka. (5 points)
- (iii) Discuss the formation of Cauvery Basin in the north-west of Sri Lanka (5 points)
- (iv) Write a concise account on the petroleum prospect in Sri Lanka? (5 points)



SECTION C – Geological Applications

- 7) Describe the following terms used in hydrogeology.
- (a) Porosity and permeability
 - (b) Perched water table
 - (c) Artesian wells
 - (d) Darcy's Law (5 points each)
8. The government of Sri Lanka has completed a series of hydropower and irrigation projects associated with main rivers in Sri Lanka.
- (i) List the main river/s associated with the following hydropower projects in Sri Lanka
 - a) Samanalawewa
 - b) Kothmale
 - c) Rantambe
 - d) Laxapana
 - e) Polpitiya (5 points)
 - (ii) What geological factors would you consider when you design a damsite and a reservoir? (5 points)
 - (iii) The Victoria Hydropower Project has a long tunnel whereas Randenigala has a very short. Can you explain the facts behind this difference? (5 points)
 - (iv) Write a critical note on the positive and negative aspects of hydropower projects in Sri Lanka? (5 points)
9. (i) What is modern definition for a gemstone? (5 points)
- (ii) List TWO instruments used in gem identification and their usage. (5 points)
- (iii) What are the gem enhancement techniques used in gem industry? (5 points)
- (iv) Describe the chemistry behind the colour enhancement of 'Geuda'. (5 points)

