

Uva Wellassa University, Sri Lanka
End Semester Examination – June 2009
MRT 111-1 Earth Materials I



Time: One (01) hour

Total 06 Questions

Answer four (4) questions only

Illustrate your answers with labeled sketch diagrams where necessary

- 01) I. State the definition of a mineral and describe each attribute of that definition in detail. (10 marks)
- II. List out physical properties of minerals with a brief description. What are the factors that determine the physical properties of minerals? Explain your answer. (15 marks)
- 02) I. What are the basic assumptions in layered packing arrangement of atoms/ions in minerals? (05 marks)
- II. Describe the Cubic Closest Packing (CCP) structure. (10 marks)
- III. Explain Radius Ratio and its relationship with Coordination Geometry. (10 marks)
- 03) I. What are the factors that govern the symmetry in mineral crystals? (05 marks)
- II. Giving examples discuss symmetry elements and symmetry operations in mineral crystals. (15 marks)
- III. Relate $\bar{3}$ symmetry operation to a combination of other symmetry elements. (05 marks)
- 04) I. List out all crystal systems and indicate the characteristic symmetry of each system. (10 marks)
- II. Describe the crystal system which has one 4-fold axis as the essential symmetry including its common crystal classes and different crystal forms. (15 marks)

05) I. With the help of a reference frame of three orthogonal axes describe how you calculate the Miller Index of a planar surface. (10 marks)

II. Draw a hexagonal prism which has the general form $\{11\bar{2}0\}$ and label each face with its Miller Index. (15 marks)

06) I. Write short notes on,

- a. Unit Cell and Lattice
- b. Crystal Habits
- c. Crystal Intergrowths

(15 marks)

II. Using face intercepts on crystallographic axes, show that parallel faces of a crystal have the same Miller Index.

(10 marks)