

Uva Wellassa University, Sri Lanka
End Semester Examination – August 2010

MRT 111-1 Earth Materials I
-Repeat-

Time: One (01) hour



Total five (05) Questions

Answer four (4) questions only

Illustrate your answers with labeled sketch diagrams where necessary

- 01) i. Explain how radius ratio affects coordination geometry in chemical compounds. (10 marks)
- ii. Describe different closest packing structures in minerals assuming atomic hard sphere model. (15 marks)
- 02) i. Define the following terms and describe briefly. (25 marks)
- Unit Cell and Lattice
 - Crystal Forms
 - Symmetry Elements and Operations
- 03) i. List out all crystal systems and indicate the essential symmetry of each system. (10 marks)
- ii. With an illustrated example describe the 3-fold roto-inversion symmetry in a crystal. (15 marks)
- 04) i. Describe the crystal system which has three 2-fold axes as the essential symmetry including its common crystal classes and different crystal forms. (10 marks)
- ii. Draw (a) an octahedron (b) a hexagonal prism, and label each face of the two forms with their Miller Indices. (15 marks)

05)

Describe how you would calculate the Miller Index of a planar surface. Derive the Miller Index of a planar surface in a crystal that intersects +a axis at a unit length, +b axis at two units and is parallel to c axis. Show that any plane parallel to the above will have the same Miller Index. The second plane should also intersect +a and +b axes.

(25 marks)