



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2013/2014

SECOND YEAR FIRST SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF SCIENCE IN EARTH SCIENCE WITH
INFORMATION TECHNOLOGY

(MAIN CAMPUS)

NGA 202: PRINCIPLES OF MINERALOGY

Date: 18th November, 2013

Time: 2.30 - 4.30 p.m.

INSTRUCTIONS:

- **Answer Question ONE and any other TWO questions.**
- **Sketch maps and diagrams should be used whenever appropriate.**

NGA 202: PRINCIPLES OF MINERALOGY

1. a) Describe the symmetry elements of the isometric and tetragonal Systems. (8 marks)
- b) Explain the following terms as used in mineralogy
 - i) Crystal structure (3 marks)
 - ii) Exotic and Inherent colours in minerals (3 marks)
 - iii) Isotropism (3marks)
- c) Describe the conditions necessary for a substance to form a mineral. (6 marks)
- d) Define twinning and explain its effects in mineralogy (7 marks)
2. a) Explain the role of crystallography in the study of minerals. (8 marks)
- b) Describe the optical properties of minerals observed under crossed polarized light (12marks)
3. a) Describe three ways in which crystalline matter can be formed (12 marks)
- b) Explain four characteristics of a mineral (8 marks)
4. a) Explain how hardness and cleavage of a mineral are related to the crystal structure (11 marks)
- b) Explain the economic application of the above properties (in 4a) in gemmology (9 marks)
5. a) Explain the various environments of mineral occurrence (10 marks)
- b) Explain the use of the X-ray diffraction method for mineral analysis and identification (10 marks)
6. Describe the surface properties of minerals and their economic application in ore dressing (20 marks)