



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
SCIENCE AND TECHNOLOGY DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

CARTOGRAPHY, SURVEYING & GEOMATICS, CIVIL ENGINEERING

SUBJECT: Geology

PAPER NO: 313/13/S06

DURATION: 3 Hours

MARCH/APRIL 2017 EXAMINATION

REQUIREMENTS

Scientific calculator

INSTRUCTIONS TO CANDIDATE

- 1) Answer any five (5) questions.**
- 2) All Questions carry equal marks.**

QUESTION 1

- a) The following terms are the evidences of past glacial presence, briefly describe:
- i) Glacial valley (2 marks)
 - ii) Glacial striations (2 marks)
 - iii) Cirques (2 marks)
 - iv) Hanging valley (2 marks)
 - v) Kettle lakes (2 marks)
- b) Describe the following branches of geology:
- i) Structural geology (2 marks)
 - ii) Mineralogy geology (2 marks)
 - iii) Economic geology (2 marks)
 - iv) Engineering geology (2 marks)
 - v) Pathology geology (2 marks)

QUESTION 2

- a) Seismic studies have shown that the earth is composed of three main layers. Write note on these three main layers. Support your answer with a well labelled diagram. (8 marks)
- b) State any two examples of each of the following rock forming minerals.
- i) Dark coloured silicate minerals (2 marks)
 - ii) Light coloured silicate minerals (2 marks)
 - iii) Non-silicate metallic ore minerals (2 marks)
 - iv) Carbonates minerals (2 marks)
 - v) Evaporates minerals (2 marks)
- c) All silicate minerals possess the silicate oxyanion. Give your understanding of this statement. (2 marks)

QUESTION 3

- a) Differentiate these two terms as for the crystallisation of magmas described using the Bowen reaction series:
- i) Continuous series (1 mark)
 - ii) Discontinuous series (1 mark)
- b) Tabulate the classification of igneous rocks considering rock type, the amount of silica present and minerals. In your answer include the minerals in each classification. (12 marks)
- c) Outline the geological work of running water. (5 marks)
- d) Describe the two types of joints which are:
- i) Major joints
 - ii) Minor joints (1 mark)

QUESTION 4

- a) Give the uses of geological map. (2 marks)
- b) Define the following terms used in geology:
- i) Cross section (2 marks)
 - ii) Profile (2 marks)
 - iii) Contour line (2 marks)
 - iv) Strike line (2 marks)
- c) Describe the four chief agents of mechanical weathering. (8 marks)
- d) State the factors that constitute to the classification of folds. (2 marks)

QUESTION 5

- a) Write notes on the three forms of metamorphism. (6 marks)
- b) Discuss the three crystal systems which are:

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- i) Cubic/isometric (3 marks)
- ii) Tetragonal (3 marks)
- iii) Orthorhombic (3 marks)
- c) List the three individual clay minerals. (3 marks)
- d) Contrast the two textures of igneous rocks which are Phanero crystalline texture and aphanitic crystalline textures. (2 marks)

QUESTION 6

- a) Briefly describe the following textures of sedimentary rocks:
 - i) Size of grains (4 marks)
 - ii) Degree of roundness (4 marks)
 - iii) Spherist (4 marks)
 - iv) Degree of sorting (4 marks)
- b) Explain how chemical sediments are made and give one example of these rocks. (2 marks)

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