

UNIVERSITY OF FORT HARE

GLG322
Metamorphic Petrology
Engineering Geology

BSc Supplementary Examination
November 2025

Time: 3 Hours

Marks: 100

Subject: Geology

One Paper



This paper consists of 2 pages including the cover page

Together in Excellence

Internal Examiners

Mr S Sinuka
Miss N Tyhutyhani

External Examiner

Prof B Yibas

INSTRUCTIONS

Answer all questions.

SECTION A: METAMORPHIC PETROLOGY (Mr S Sinuka)

Question One

[25]

Discuss the influence of rock deformation on metamorphic textures and processes. Your discussion must include:

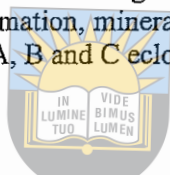
- a) The different types of deformations (7)
- b) Differentiating between dislocation flows and pressure solutions (7)
- c) Textures produced by deformation during metamorphism and preferred orientations (7) that develop.
- d) Accompanying diagrams (4)

Question Two

[25]

The metamorphism of basic igneous rocks varies from low to high temperature and pressure conditions. Briefly discuss the varying grades of metamorphism from low temperature-low pressure to high temperature-high pressure:

- (a) Greenschist Facies, transition from the Greenschist to the Blueschist Facies, mineral assemblages present in the Greenschist Facies, conditions of formation and mineral reactions transitioning from the Greenschist to the Blueschist Facies. [6]
- (b) Blueschist Facies, metamorphic mineral assemblages present, pressure and temperature conditions of formation and mineral reactions associated with the Blueschist Facies. [6]
- (c) Transitional blueschist, transitioning from the Blueschist to the Eclogite Facies, reactions indicating the upper temperature limit of the blueschist, reaction indicating the highest temperature blueschist and reaction indicating high pressure blueschist. [7]
- (d) Eclogite Facies, conditions of formation, mineral assemblages present in the Eclogite Facies and Differentiate between Group A, B and C eclogites. [6]



SECTION B: ENGINEERING GEOLOGY (Ms N Tyhutyhani)

Question Three

[25]

Illustrate, with the aid of diagrams/drawings, the different topographic zones of a beach, and explain the hydrodynamic conditions of each zone, and the particular topographic features observed in a rocky coast.

- a) What is a beach? (1)
- b) Major parts of a beach with an accompanying diagram (6)
- c) With an aid of a diagrams, explain the phenomena at rocky coasts (5)
- d) Differentiate between spits and baymouth bars (2)
- e) Explain how tombolos form (2)
- f) Differentiate between longshore bars and barrier islands (2)
- g) What is an estuary? Discuss the various parts of an estuary (2)
- h) What are tidal flats? (2)
- i) What are coral reefs? Differentiate between the various types of reefs. (3)

Question Four

[25]

- (a) With the aid of drawings/diagrams, show detailed soil zonations and describe the characteristics of each zone in a profile of matured soils. [15]
- (b) Briefly discuss the factors affecting soil formation. Your discussion must include the significance of the parent material, topography, vegetation, time and climate. [10]