



UNIVERSITY EXAMINATIONS
FOURTH YEAR EXAMINATION FOR THE AWARD OF
THE DEGREE OF BACHELOR OF SCIENCE IN GEOPHYSICS AND MINERALOGY

SECOND SEMESTER 2021/2022
(FEBRUARY – JUNE, 2022)

BSMN 423: IGNEOUS PETROGENESIS

STREAM: Y4 S2

TIME: 2 HOURS

DAY: WEDNESDAY, 12:00 PM – 2:00 PM

DATE: 16/05/2022

INSTRUCTIONS

- 1. Do not write anything on this question paper.**
- 2. Answer Section A (Compulsory) and any other TWO Questions in section B.**

QUESTION ONE

- Define igneous petrogenesis (2 marks)
- Briefly describe the rock cycle with the aid of a diagram (8 marks)
- Define magma generation and state the three types of magma generation. (4 marks)
- Classify igneous rocks on the following basis (9 marks)

Mode of formation	textures	Mineralogy and composition	Silica content

- e) Explain the meaning of the following terms (5 marks)
- i) Petrogenic provinces
 - ii) Volcanic chains
 - iii) Island arcs
 - iv) Ophiolites
 - v) Hot spots
- f) Define a magma reservoir (2 marks)

QUESTION TWO

- a) State four environments for magma formation (4 marks)
- b) State three factors that affect the fluidity of magma (3 marks)
- c) State and explain three origins of magma (6 marks)
- d) Differentiate between primary melts and parental melts as used in evolution of magma (2 marks)
- e) Briefly describe the concept of migration of magma (5 marks)

QUESTION THREE

- a) What is a Petrogenic province (2 marks)
- b) Define the following as used in Petrogenic provinces (6 marks)
- i) Basaltic provinces
 - ii) Granite-granodiorite provinces
 - iii) Mafic-ultramafic complexes
- c) Describe, using a table, the following in terms of silica content, viscosity, eruptive behavior and distribution (can use a table) (12 marks)
- i) Ultramafic
 - ii) Mafic
 - iii) Andesitic
 - iv) felsic

QUESTION FOUR

- a) What is magmatic differentiation (2 marks)
- b) Briefly describe the following magmatic pipes (6 marks)
- i) Dykes
 - ii) Sills
 - iii) Plutons
- c) Distinguish between convergent plate margins and divergent plate margins (4 marks)

- d) Highlight on the following magmatic geosystems (8 marks)
- i) Island arc plate subduction
 - ii) Plate divergence
 - iii) Hot-spot volcanism
 - iv) Continental plate subduction

QUESTION FIVE

- a) Outline any four rules of plate tectonics (4 marks)
- b) Outline four sources of mantle material (8 marks)
- c) Distinguish between volcanic arc and a volcanic chain (4 marks)
- d) Differentiate between assimilation and zone melting (4 marks)