INTERNATIONAL UNIVERSITY OF EAST AFRICA

'Learning to Succeed'

FACULTY OF ENGINEERING

END OF SEMESTER EXAMINATIONS - APRIL 2025

PROGRAMME: BACHELOR OF PETROLEUM ENGINEERING

YEAR/SEM: YEAR 1/SEMESTER 1

COURSE CODE: PTE1152

NAME: INTRODUCTION OF GEOLOGY

DATE: 2025-04-25

TIME: 9:00AM-12:00PM

INSTRUCTIONS TO CANDIDATES:

1. Read the instructions very carefully
2. The time allowed for this examination is STRICTLY three hours
3. Read each question carefully before you attempt and allocate your time equally between all the Sections
4. Write clearly and legibly. Illegible handwriting cannot be marked
5. Number the questions you have attempted
6. Use of appropriate workplace examples to illustrate your answers will earn you bonus marks
7. Any examination malpractice detected will lead to automatic disqualification.

DO NOT WRITE ANYTHING ON THE QUESTION PAPER

Section A Attempt any TWO Questions (40 Marks)

Question 1:

a) (i) Re-arrange the following in the order of their abundance within the Earth's crust;

Si, Mg, O, and Al **(2 marks)**

b) State the following laws of stratigraphy and explain how each can be applied in the field to understand the stratigraphic arrangement in rocks **;**

(i) Cross cutting relation **(6 marks)**

(ii) Inclusion **(6 marks)**

(ii) Faunal succession **(6 marks)**

Question 2:

a) What is meant by **"**Metamorphic grade**"**? **(1 mark)**

b) State the characteristics of the following rocks and comment on the metamorphic grade of each rock.

(i) Gneiss (4 marks)

(ii) Slate (5 marks)

(iii) Schist (3 marks)

c) (i) Define a "geological time scale"? **(1 mark)**

(ii) What geological time are we living in today? **(4 marks)**

(iii) Some believe that we are now in a new geological age. Do you agree? (explain your answer). **(2 marks)**

Question 3:

a) (i) What is "sediment sorting"? **(1 mark)**

(ii) Briefly explain how sorting and rounding can be used to determine the degree of sediment maturity **(4 marks)**

(iii) Briefly explain any three (**3**) key environmental factors that affect the rate of weathering **(6 marks)**

b) (i) List four (**4**) the major cratons in the African continent **(4 marks)**

(ii) Briefly explain the formation hypothesis of cratons. **(5 marks)**

Question 4:

a) (i) State any three **(3)** characteristics of Jovian planets **(3 marks)**
(ii) Explain why the planets in **b(i)** above are considered to be less dense than the terrestrial planets. **(2 marks)**

b) (i) State the elemental composition of the following; **(3 marks)**
Lithosphere, Mantle, and the **outer core**

(iii) Differentiate between a "**rock**" and a "**mineral**". **(2 marks)**

c) Briefly explain how the following metamorphism occur;

(i) Contact **(5 marks)**

(ii) Regional **(5 marks)**

Section B Attempt any THREE Questions (60 Marks)

Question 1:

a) Define "**Foliation**" in rocks, and briefly explain how it is formed **(5 marks)**

b) Discuss the agents of metamorphism and how each result into formation of Metamorphic rocks **(15 marks)**

Question 2:

Write notes on the following EONs **(**stating the range of time and what happened);

(i) Archean, (5 marks)

(ii) Proterozoic (5 marks)

(iii) Phanerozoic (10 marks)

Question 3:

a) (i) state any four (**4**) elements of a petroleum system **(4 marks)**

(ii) Briefly describe the processes that occur within a petroleum system **(8 marks)**

b) Describe mineralization distribution within your country of origin and justify why minerals are mainly found in such areas or regions. **(8 marks)**

Question 4:

(a) State any;

(i) three (**3**) conditions that causes **exfoliation** in rocks **(3 marks)**

(ii) two **(2)** conditions that can lead to surface chemical weathering of rocks **(2 marks)**

(b) Using an example in each case, explain the how rocks and minerals can be classified based on their textural properties **(15 marks)**