



KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

IN PETROLEUM ENGINEERING

EPL 306: PETROLEUM GEOLOGY

1ST SEMESTER 2023/2024

TIME: 2 HOURS

INSTRUCTIONS:

The examination consists of **TWO** sections (A and B). Answer SECTION A (**Compulsory**) and **ANY TWO QUESTIONS** from SECTION B

Section A- Compulsory (30 marks)

QUESTION 1

- a) Explain the meaning of the following terms as used in oil and gas. (10 marks)
- i. Crude oil
 - ii. Weathering
 - iii. Lithification
 - iv. Cementation
 - v. Trap
- b) Briefly discuss the required conditions for geological accumulation of petroleum. (7 marks)
- c) Briefly distinguish the following three successive stages of hydrocarbon formation: diagenesis, catagenesis and metagenesis. (6 marks)
- d) Briefly discuss the five main agents of sediment erosion and transport. (7 marks)

QUESTION 2

- a) Discuss the following terms as used in the formation of sedimentary rocks. (6 marks)
- i. Grainsize
 - ii. Sorting
 - iii. rounding.
- b) Discuss three main factors that affect roundness as a process of sedimentary rocks.(6marks)
- c) With the help of diagrams where necessary, discuss the effects of erosion across a river profile in the following sections. (8 marks)

- i. Near the source
- ii. Midway between the source and the Sea
- iii. Near the sea

QUESTION 3

- a) Explain the meaning of the following basic terms as used in oil and gas exploration.
(4 marks)
 - i. Mass wasting
 - ii. Seismic Stratigraphy
- b) Briefly discuss the following processes that occur during lithification of sedimentary rocks.
(6 marks)
 - i. Compaction
 - ii. Re-crystallization
 - iii. Cementation
- c) Discuss the three main classification of sedimentary rocks. (6 marks)
- d) With the help of a diagram, discuss the carbon cycle in relation to hydrocarbon generation.
(4 marks)

QUESTION 4

- a) Discuss three main factors influencing rate of weathering of rocks. (6 marks)
- b) Discuss four main factors that influence fluid distribution in a reservoir. (8 marks)
- c) Discuss three main classification of formation water that is found during hydrocarbon exploration. (6 marks)

QUESTION 5

- a) Discuss the different classification of hydrocarbon traps that can cause hydrocarbon accumulation. (9 marks)
- b) Discuss four general properties of oil and gas. (8 marks)
- c) Discuss the characterization of formation water found during hydrocarbon exploration.
(3 marks)