



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, MAY, 2018

COURSE NO: PE 172
COURSE NAME: PETROLEUM GEOLOGY
CLASS: PE II

TIME: 3 HRS

Name: _____

Index Number: _____

INSTRUCTIONS

Attempt questions 1 to 5 and either question 6 or 7.

Write **all** your answers in the answer booklets provided.

The mark for each question is indicated in brackets above or beside the question.

Question 1 (2 Marks each)

Briefly define/explain the following:

- i. Maturation
- ii. Thermogenic gas
- iii. Oil Window
- iv. Closure

Question 2

- a. Briefly explain how grain size affects permeability. **(3 marks)**
- b. On a porosity-permeability cross plot, indicate the positions of the following:
Highly fractured limestone, limestone with many closed vugs, well sorted coarse sandstone, well sorted siltstone **(4 marks)**
- c. State two reasons why the depth of a reservoir is important. **(2 marks)**

Question 3 (2 marks each)

- a. In two points, defend the statement: "Petroleum is formed organically"
- b. In two points, defend the statement: "Petroleum is not formed in the reservoir rock in which it is trapped"
- c. Briefly explain why gas be formed at shallower and deeper depths than oil.

Question 4 (15 marks)

With respect to the use of petroleum, narrate the journey of carbon molecules in the atmosphere through the earth crust and back into the atmosphere, briefly describing processes and conditions in this journey.

Question 5

- a. Draw a cross section through a simple anticline trap containing one continuous column of hydrocarbons. Assume that it is filled with oil, water and gas. Indicate the relative positions of each fluid type and label all contacts, and rock types (your choice but must be reasonable). Also label all the parts of this trap. **(5 marks)**
- b. If the total thickness of the hydrocarbon bearing interval is 40 m, and there are four layers of 2 m thick shales in this interval, what are the gross and net pays respectively? If this trap is full, what is the closure of this trap? **(3 marks)**

Question 6 (2 marks each)

- a. List four unconventional petroleum resources you know.
- b. List two unconventional hydrocarbons that are currently widely exploited and state two countries, one for each, where these resources listed above are currently widely exploited.
- c. State the two main factors that control the exploitation of unconventional hydrocarbons.
- d. Briefly describe how shale gas may be produced.

Question 7

- a. On a sketch map, show the documented sedimentary basins in Ghana, paying attention to sizes but not to scale. **(4 marks)**
- b. List two basins where petroleum is produced or expected to be produced soon with the name of a producing or discovered field in each. **(3 marks)**