UNIVERSITY OF RUHUNA

FACULTY OF FISHERIES AND MARINE SCIENCES & TECHNOLOGY

Academic Year 2023/2024

Bachelor of Science Honours in Marine and Freshwater Sciences Degree

Level IV Semester I Examinations - April /May 2025

OCG 4113 – Introduction to Upstream Petroleum Industry Time: 2 hours

Answer All Questions in PART A and only three (3) Questions from PART B

PART B

1.

i. Describe the critical elements of a petroleum system and explain how the absence of any one element would prevent hydrocarbon accumulation. (10 Marks)

ii. Compare and contrast Type I vs. Type III kerogen in terms of chemical composition, hydrocarbons generated and depositional environments. (05 Marks)

iii. Describe with some examples how ancient seas give rise to hydrocarbon trap formation. (05 Marks)

iv. What is a frontier basin? (02 Marks)

v. How do you determine the end of rifting period of the basin? (03 Marks)

2.

i. List five (05) benefits of petrophysical logs. (05 Marks)

ii. Why is the caliper log very important in petrophysical log interpretation? (02 Marks)

iii. Describe why the neutron porosity tool records anomalously low values on reservoirs filled with natural gas. (08 Marks)

iv. In a petrophysical log of an offshore well, RKB = 23 m. What does it mean? (03 Marks)

v. Describe the difference between laterologs and induction logs and the borehole conditions that limit their use. (02 Marks)

vi. Shallow, medium and deep resistivity logs from a particular depth interval show no separation. What can you tell about the lithology of this depth interval? (05 Marks)

3.

i. What are the factors an oil company consider before venturing into oil exploration in the Mannar Basin in Sri Lanka? (08 Marks)

ii. Considering the major petroleum system elements, describe the petroleum potential of the Sri Lankan side of the Cauvery Basin. (07 Marks)

iii. Illustrate the pattern of heat flow history for the Cauvery Basin and relate it to the basin's tectonic history. (05 Marks)

iv. Given the tectonic history, what hydrocarbon traps would you expect to see in the Cauvery and Mannar basins? (05 Marks)

4. Write short notes on any five (05) of the following.

i. Evidence for the organic origin of petroleum

ii. Chemical composition of crude oil

iii. Drilling fluid and its advantages

iv. Physical properties of petroleum

v. Source rock maturity indicators

vi. Enhanced oil recovery techniques (05 * 5 = 25 Marks)

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