

UNIVERSITY OF RUHUNA  
BACHELOR OF SCIENCE IN FISHERIES AND MARINE SCIENCES DEGREE

Level IV Semester I Examination

July 2017

OCG 4122 - Hydrocarbon and Mineral Resources

Time: 02 hour

Answer **any Four (04)** questions.

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1. Answer any 4 of the following (25 Marks)

- a. What is petroleum? Briefly describe the composition of crude oil.
- b. Mention the world's petroleum producing regions. Which region owns the largest conventional oil reserves? List the top five countries having the highest conventional oil reserves in descending order.
- c. Briefly describe the composition of natural gas. What is *casing head gas*?
- d. What is API gravity? Briefly describe its applications.
- e. Mention 5 different types of petrophysical/ wire line logs used in petroleum industry. Briefly describe their applications.
- f. List the basic geological elements that should be combined to form a petroleum deposit.

2. (25 Marks)

- i) Briefly explain the theory behind the seismic method used for petroleum exploration.
- ii) What is a Direct Hydrocarbon Indicator (DHI)? What are their significance in petroleum industry.
- iii) Interpret and label the geological structures and key horizons on the given seismic section.

3. (25Marks)

- a) Natural gamma ray log obtained for a sandstone reservoir of an oil field in the North Sea in Norway yields  $GR_{Zone} = 75$  API,  $GR_{sand} = 35$  API and  $GR_{shale} = 235$  API. Calculate the clay percentage in the reservoir rock.
- b) Bulk density of the above reservoir is  $2.45 \text{ g/cm}^3$ . If entire pore spaces of the reservoir is filled with oil having a specific gravity of 0.85, calculate the porosity of the reservoir rock.
- c) If the volume of the reservoir is  $10^7 \text{ m}^3$ , calculate the Stock Tank Oil Initially in Place (STOIP). Assume that the reservoir is completely composed of sandstone and no intermitting clay/shale layers are present. Oil Formation Volume Factor ( $B_o$ ) of the reservoir is 1.2.

4. Write short notes of any 5 of the following. (25 Marks)
- a. Manganese nodules
  - b. Gas hydrates
  - d) Limestone deposits in Sri Lanka
  - e) Mineral sand deposits that could occur in Sri Lanka's Exclusive Economic Zone (EEZ).
  - f) Enhanced oil recovery techniques.
  - g) Offshore drilling for petroleum exploration
5. Write a detailed description of the history and the current status of oil exploration in Sri Lanka. (25 Marks)

Use the following figure when answering the question No. 2 (iii)

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