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The Assam Royal Global University, Guwahati

Royal School of Environmental and Earth Sciences

M. Sc. Geology 4th Semester

Semester End Examination, June 2023

Course Title: Fuel Geology

Course Code: GEOL164C401

Time: 3 Hours

Maximum Marks: 70

Note: Attempt all questions as per instructions given.

The figures in the right-hand margin indicate marks.

Section – A

1. Attempt **all** questions. (Maximum word limit 50) 2 x 8
- What are the controlling factors for biochemical transformation in coal?
 - Give a brief idea on the in-situ theory of origin of coal.
 - What is 5% rule for the transformation of microbands to microlithotypes? Give example.
 - What is mineral rich and charcoal rich coal?
 - What is vitrinite reflectance?
 - What is saturated hydrocarbons? Give examples.
 - Make a list of oil fields of Assam and Arunachal Pradesh.
 - Name the reservoir rock of Bombay Off-Shore. Which is the richest deposit in India?

Section – B

2. Attempt **any two** of the following: 6 x 2
- Write the different grades of coal. Draw a sketch showing the evolutionary development of flora for the generation of peat.
 - What is peat swamp? Explain the paleogeographic and tectonic requirements for the origin of peat.
 - What is coalification and mention its causes. Mention some chemical changes of coal associated with progressing coalification.
3. Attempt **any two** of the following: 7 x 2
- What is microlithotype? Tabulate the microlithotypes following ICCP, 1975 on the basis of maceral composition, microlithotype, maceral group composition and microlithotype group.
 - What are the chemical properties of coal? Discuss the ultimate analysis of coal.
 - Discuss the geological and geographical distribution of coalfields of Assam with representative maps.
4. Attempt **any two** of the following: 7 x 2
- What is oil window? What is the range of oil window in the Mesozoic source rock? Draw a suitable diagram to show the formation of the types of petroleum in relation with the oil window.
 - Discuss the factors influencing connectivity and reservoir development in deep-water marine reservoirs.

- c. Why is permeability considered as important reservoir rock property? What are the factors affecting the magnitude of permeability? In what way fluid saturation property helps a reservoir engineer?

5. Attempt **any two** of the following: 7 x 2

- a. With suitable diagrams, explain the primary and secondary stratigraphic traps.
- b. Draw a sketch of anticlinal structural trap to explain the basin trap fluid taxonomy.
- c. Write short notes on: (any two)
 - (i) Fractured reservoirs
 - (ii) Hydrodynamic traps
 - (ii) Combination traps