PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Winter 2022-23 Examination

Semester: 3   Date: 03/10/2022
Subject Code: 203120207   Time: 02:00 pm to 04:30 pm
Subject Name: Petroleum Exploration   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions** - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark)   **(15)**

1. What type of rock is petroleum exclusive to?
(a) Sedimentary rock   (b) Metamorphic rock
(c) Igneous rock   (d) Plutonic rock

2. A group of sedimentary rock that were originally thought to have formed from the evaporation of sea water is?
(a) Limestone   (b) Sandstone
(c) Evaporates   (d) Dolomite

3. Which of the following is sedimentary rock?
(a) lignite   (b) Granite
(c) Graphite   (d) All of the above

4. The amount of wax in crude oil is indicated by_____ of the oil?
(a) Pour point   (b) Cloud point
(c) Flash point   (d) Vapor pressure

5. Which of these is a must of petroleum generation and accumulation?
(a) Source rock   (b) Porous reservoir rock
(c) Impermeable cap rock   (d) All of the above

6. Kerogen, the_____part of organic matter I sedimentary rocks that is formed during diagenesis?

7. Define the spill point with diagram?

8. What is the concept of mud logging?
9. Write down the examples of lithology logs?
10. What is the formula of total organic carbon (TOC)?
11. Write the four names of sedimentary rocks?
12. _____ geologic structure usually form the largest petroleum traps?
13. A common mineral found in carbonate sedimentary rock is _____?
14. _____ is the layering of sediments in sedimentary rock?
15. Rock formed from dissolved minerals and water are known as_____?

Q.2 Answer the following questions. (Attempt any three)   **(15)**
A) What do you mean by seismic wave? Explain it with the help of flow diagram in detail?
B) What is the concept of geophone and hydrophone? Explain briefly with diagram.
C) The sonic log travel time in a loosely consolidated formation is 260 µs/m. The matrix and fluid travel times are 130 µs/m and 618 us/m, respectively. A correction factor of 1.0 may be used in a Wyllie time average equation for simplification. The calculated formation porosity using the Wyllie time average equation is %?
D) What is seismic impedance and reflection coefficient? Explain it with mathematical formula.

Q.3 A) An oil well is drilled using an 8.5-inch drill bit at a penetration rate of 30 ft/hr. The rotary speed is 20 rpm and the weight on the bit is 3500 lb. The value of the'd' exponent for the drilled section is _____ (rounded off to two decimal places).   **(07)**

B) What is terminology of fold in petroleum exploration? Explain it with diagrams and mention all the necessary terms in diagrams.   **(08)**

OR

B) What is rock eval pyrolysis? Define production index, oxygen index and hydrogen index with mathematical formula?   **(08)**

Q.4 A) What are the porosity logs? Define density log in detail and mention the mathematical formula of **(07)** density porosity?

<div align="center">**OR**</div>

A) What do you mean by petroleum exploration methods? Explain anyone in detail. **(07)**

B) In a sandstone reservoir, the density log reads 2.11 g/cc and sonic log reads 90 µs/ft. The other **(08)** parameters are given below:

Matrix density (ρma) = 2.68 g/cc

Fluid density (ρf) = 1.0 g/cc

Compressional wave travel time in matrix (Δtma) = 54 µs/ft

Compressional wave travel time in fluid (Δtf) = 189 µs/ft

The calculated secondary porosity of the reservoir is_____%?