| Roll No | | | | | | | | | | | |
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# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING
## MID TERM EXAMINATION - APR 2023

**Semester :** Semester IV - 2021

**Course Code :** PET2002

**Course Name :** Sem IV - PET2002 - Fundamentals of Geophysical Logging Techniques

**Program :** PET

**Date :** 12-APR-2023

**Time :** 9.30AM - 11.00PM

**Max Marks :** 50

**Weightage :** 25%

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**Instructions:**

*(i) Read all questions carefully and answer accordingly.*
*(ii) Question paper consists of 3 parts.*
*(iii) Scientific and non-programmable calculator are permitted.*
*(iv) Do not write any information on the question paper other than Roll Number.*

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### PART A

**ANSWER ALL THE QUESTIONS** **(5 X 2 = 10M)**

**1.** Name the sources of following petrophysical data.
1. Mud Log
2. Cores
3. Open Hole Log
4. Cased Hole Log

(CO1) [Knowledge]

**2.** Name at least two open hole logs.

(CO1) [Knowledge]

**3.** List down the information gathered from petrophysical data.

(CO1) [Knowledge]

**4.** Write the equation that relates formation resistivity and porosity.

(CO2) [Knowledge]

**5.** Fill in the blanks: Archie's equation express the relationship between_____and_____.

(CO2) [Knowledge]

## PART B

**ANSWER ALL THE QUESTIONS** **(2 X 10 = 20M)**

**6.** Porosity and Permeability data for two wells are plotted in Figure X. Explain the significance of Figure X.

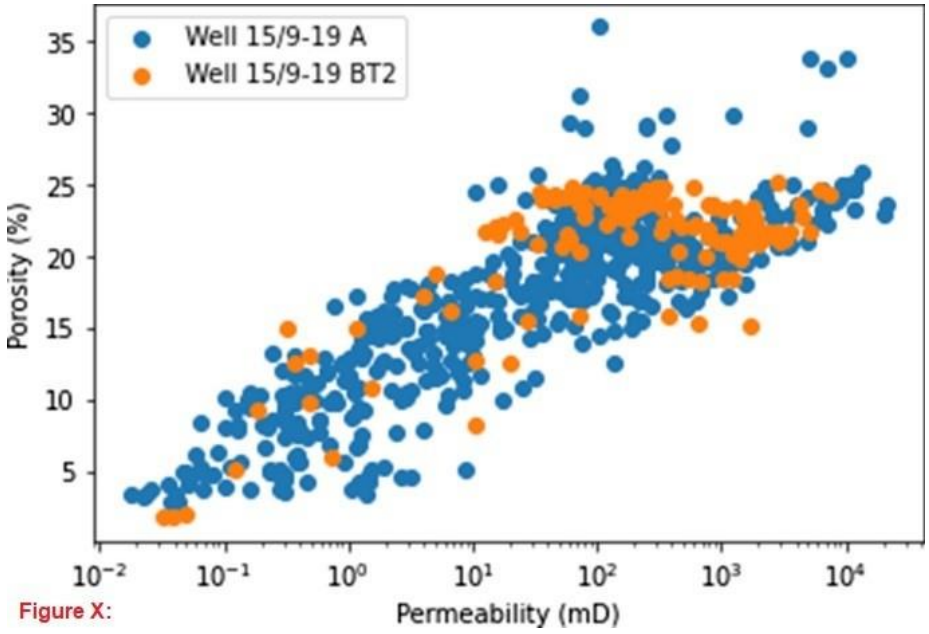


Figure X:

(CO1) [Comprehension]

**7.** Geophysical log responses are plotted in Figure A. Interpret the log responses as an oil and gas professional.

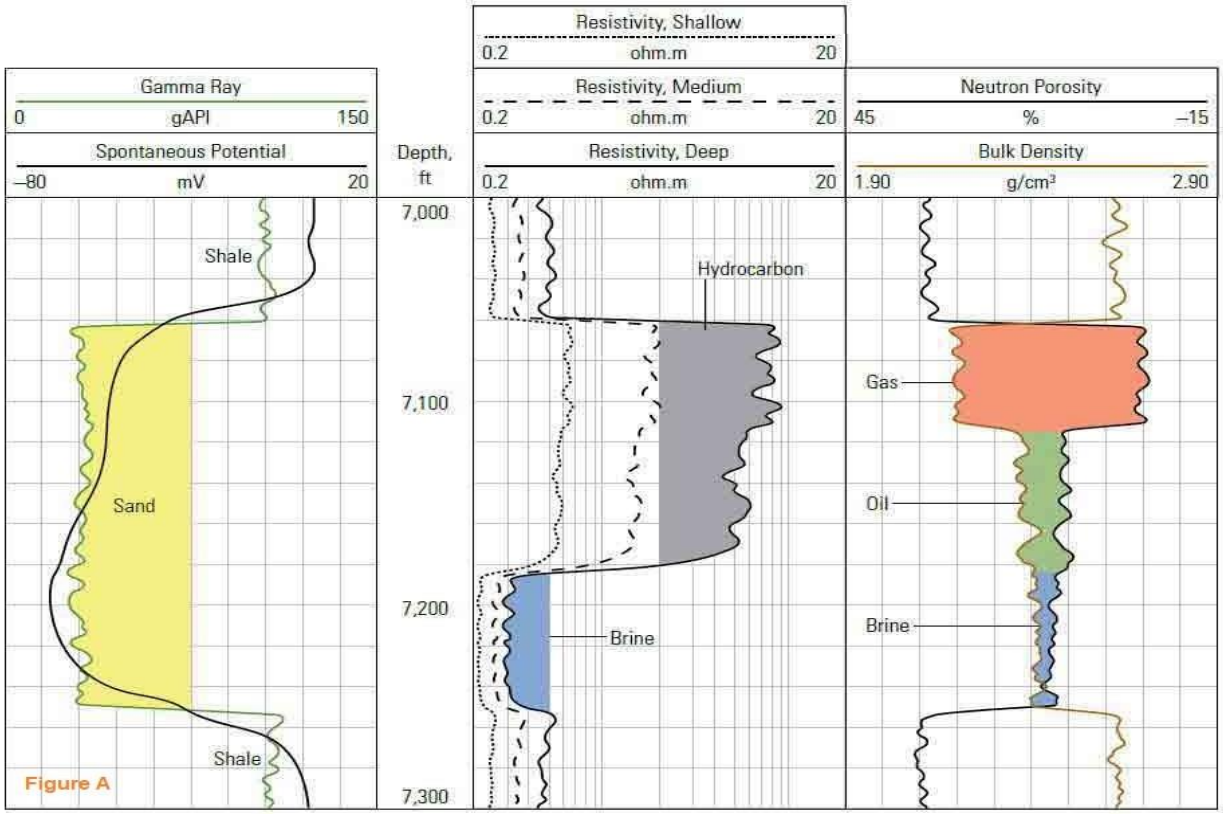


Figure A

(CO2) [Comprehension]

## PART C

**ANSWER THE FOLLOWING QUESTION** **(1 X 20 = 20M)**

**8.** Direct measurements of filtrate and mud-cake samples are preferred. When the direct measurements of mud-filtrate resistivity (Rmf) and, mud-cake resistivity ((Rmc) is not possible, then the following methods can be used to estimate Rmf and Rmc.

Method 1: Lowe and Dunlap
Method 2: Overton and Lipson
Method 3: Statistical Approximation

Estimate Rmf and Rmc using all the methods when Rm = 3.5 ohm-m at 24°C and Mud Weight = 1920 kg/m3. If any particular method is not applicable, then explain the reason. (c) If more than one method is applicable, then compare the results.

Required data form the following Table can be used for calculation,

| **Mud Weight** | | **Km** |
|---|---|---|
| **lbm/gal** | **Kg/m3** | |
| 10 | 1200 | 0.847 |
| 11 | 1320 | 0.708 |
| 12 | 1440 | 0.584 |
| 13 | 1560 | 0.488 |
| 14 | 1680 | 0.412 |
| 16 | 1920 | 0.380 |
| 18 | 2160 | 0.350 |

(CO2) [Application]