PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023

Semester : Semester IV -2021
Course Code : PET2012
Course Name : Sem IV - PET2012 - Reservoir Fluid Mechanics
Program : PET

Date : 17-APR-2023
Time : 2PM - 3:30PM
Max Marks : 50
Weightage : 25%

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.

PART A

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

1. Define dynamic viscosity. Also, write down its mathematical expression.

    (CO1) [Knowledge]

2. Define specific weight. Write down its unit and dimensional formula.

    (CO1) [Knowledge]

3. State hydrostatic law. Also, write down its mathematical expression.

    (CO1) [Knowledge]

4. Define convective acceleration. Also, state the value of convective acceleration for uniform flow.

    (CO2) [Knowledge]

5. Define potential function with mathematical expression.

    (CO2) [Knowledge]

PART B

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

6. Estimate the validity of the following two potential functions for 2-D flow

    $$\varphi = a(x^2 - y^2) \qquad\qquad \varphi = A(cosx)$$

    (CO2) [Comprehension]

7. Explain irrotational flow. The velocity potential function exists only for irrotational flow. Justify the statement.

    (CO2) [Comprehension]

PART C

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

8. A 1m wide and 1.5m deep rectangular plane surface lies in crude oil (SG = 0.88) in such a way that its plane makes an angle of 30° with the free surface. Compute the force acting and position of the center of pressure when the upper edge is 0.75m below the free surface. Also, draw the pressure profile on the surface.

(CO1) [Application]