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PRESIDENCY UNIVERSITY BENGALURU

 SCHOOL OF INFORMATION SCIENCE

 SUMMER END TERM EXAMINATION - August 2024

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| **Semester : END TERM** | **Date : 05.08.2024** |
| **Course Code : PET2012** | **Time : 9:30AM to12:30 PM** |
| **Course Name** : Reservoir Fluid Mechanics | **Max Marks : 100** |
| **Program : B.Tech** | **Weightage : 50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** |
|  **ANSWER ANY 5 QUESTIONS 5Q X 2M=10M** |
| 1 | Define viscosity of fluid. | (CO1) | [Knowledge] |
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| 2 | Define kinematic viscosity. | (CO1) | [Knowledge] |
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| 3 | State Newton’s Law of Viscosity. | (CO1) | [Knowledge] |
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| 4 | State Bernoulli’s Equation. | (CO2) | [Knowledge] |
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| 5 | State Pascal’s Law. | (CO2) | [Knowledge] |
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| 6 | Define “Single hand” Manometer. | (CO2) | [Knowledge] |
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| 7 | Write Euler’s Equation. | (CO2) | [Knowledge] |
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| **PART B** |
|  **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** |
| 8 | With the help of the above figure establish Liquid droplet equation on Surface Tension. | (CO1) | [Comprehension] |
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| 9 | With the help of the above figure establish pressure head. | (CO2) | [Comprehension] |
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| 10 | Identify the above figure. Based on your identification describe the working principle of the above figure. | (CO2) | [Comprehension] |
| 11 | A fluid flow is given by $V=xy^{2}i-2yz^{2}j-\left(zy^{2}-\frac{2z^{3}}{3}\right)k$ Prove that it is a case of possible steady incompressible fluid flow.  | (CO3) | [Comprehension] |
| 12 | Based on the above figure derive Euler’s Equation of motion. | (CO3) | [Comprehension] |
| 13 | Establish Bernoulli’s equation for real fluid. | (CO4) | [Comprehension] |
| 14 | With a neat sketch explain the conditions of equilibrium for floating and sub-merged bodies.  | (CO4) | [Comprehension] |

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| **PART C** |
|  **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** |
| 11 | If the velocity distribution over a flat plate is given by $u=\frac{2}{3}y-y^{2}$in which $u$ is the velocity in meter per second at a distance $y$ meter above plate, determine the shear stress at $y=0$ and $y=0.33m.$ Take dynamic viscosity of fluid as 9.53 poise. | (CO1) | [Application] |
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| 12 | The diameter of a pipe at the section 1 and 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of petrol flowing through the pipe at section 1 is 5m/s. Determine the velocity of section 2. | (CO2) | [Application] |
| 13 | A pipe (1) 450 mm in diameter branches into two pipes (2) and (3) of diameter 300mm and 200 mm respectively. If the average velocity in 450mm diameter pipe is 3 m/s find (i) Discharge through 450mm dia.pipe and (ii) velocity in 200mm diameter pipe if the average velocity in pipe 300mm is 2.5m/s | (CO3) | [Application] |