**D.Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY**

**Set-: I**

**Q. Paper Code:**

**22SYCE204304**

**KASABA BAWADA KOLHAPUR-416006**

**(An Autonomous Institute)**

S. Y. B. Tech Civil Engineering, Sem-III

**END SEMESTER EXAMINATION, Jan. – 2023**

Course Name: **Fluid Mechanics** Course Code: **201 CL 204**

Seat No:

**Day and Date: Monday, 23.01.2023**

**Time: 2.00 pm to 4.00 pm Max. Marks- 50**

***Instructions:***

1. *Question No. 1&2 is compulsory.*
2. *Figure to the right indicate full marks.*
3. *Give suitable general Instructions*
4. *Any other Course Specific Instructions.*

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| **BT** | **CO’s** | **Q. No.** |  | | **Marks** |
|  |  | **Q.1** | **All Questions are compulsory** | | **20** |
| **1** | **CO1** | **a** | 3 liters of crude oil weighs 28.8 N, calculate its specific weight, density and specific gravity. Specific gravity of mercury is 13.6, what would be the volume of 200 N Mercury. |  | **6M** |
| **2** | **CO2** | **b** | Find the total pressure of oil (0.85) acting on an inclined gate (45°) to the horizontal. The gate is square of size 2m x 2m &its top edge from force surface of water is at 1.5 m. Also find center of pressure. | **7 M** |
| **2** | **CO2** | c | An wooden cylindrical block 1 m diameter &7 m long has specific gravity 0.6 is kept in an oil of specific gravity 0.8. Check whether the cylinder can float in the oil with its longitudinal axis vertical. If not find the maximum length to float it in vertical position. | **7 M** |
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|  |  | **Q.2** | **All Questions are compulsory** | | **10** |
| **3** | **CO2** | **a** | State and Explain Bernoulli’s Equation with its assumptions. Draw HGL and TEL for any simple case of flow of water  **OR**  Draw neat sketch of orifice in a cylindrical tank and explain all the calibration constants |  | **4** |
| **3** | **CO2** | **b** | An inclined Venturimeter @ 45 0 is attached in 10 cm diameter pipe to measure discharge of oil ( S=0.85). Mercury manometer reads 7 cm attached to Venturimeter. Find discharge in LPS. Take appropriate value of coefficient of discharge and throat diameter. | **6** |
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|  |  | **Q.3** | **All Questions are compulsory** | | **10** |
| **2** | **CO3** | **a** | Explain Reynolds experiment and give any practical example of Laminar and turbulent flow.  **OR**  Write a short note on Separation of Boundary Layer and its control. |  | **4** |
| **3** | **CO3** | **b** | Oil is flowing in 20 mm diameter pipe at 2.0 LPS. Coefficient of kinematic viscosity and specific gravity of oil is 12 Stokes and 0.8 respectively. If length of pipe is 200 m, check the flow is laminar and find power required to overcome the viscous resistance to flow. | **6** |
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|  |  | **Q.4** | **Attempt any two out of three questions** | | **10** |
| **3** | **CO3** | **a** | A compound pipe in series comprises of 4 pipes. Length, diameter and friction factors for these pipes are (200 m, 5 cm, 0.001), (300 m ,7 cm, 0.002) , (400 m , 9 cm , 0.003) , (500 m , 10cm , 0.004). If discharge flowing through this pipe is 1.0 cumec, find equivalent pipe length and diameter. Take friction factor for equivalent pipe as 0.001. |  | **5** |
| **3** | **CO4** | **b** | Two reservoirs are connected by a pipe of diameter 10 cm and length 2.00 Km. Level difference in water surfaces of these reservoirs is 6 m. Find the discharge in the pipe, if friction factor of pipe is 0.01. Consider all major and minor losses. | **5** |
| **3** | **CO4** | **C** | Find the drag force on a truck moving with speed 100 KMPH. Projected area of truck in the direction of motion is 5 m2. Density of air is 1.22 Kg/m3, Coefficient of drag is 0.9 | **5** |

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