**20CE305**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **II/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **February, 2023** | **Civil Engineering** | | |
| **Third Semester** | **Fluid Mechanics** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | a) | | | Write about specific gravity and give one example. | CO1 | L1 | 1M |
|  | b) | | | List out the Properties of Fluid and its Unit of Measurement. | CO1 | L1 | 1M |
|  | c) | | | What is viscosity? What is the cause of it in liquids and in gases? | CO1 | L1 | 1M |
|  | d) | | | Differentiate between stream line and streak line. | CO2 | L3 | 1M |
|  | e) | | | What is the purpose of Pitot tube? | CO2 | L1 | 1M |
|  | f) | | | List out the different types of flows. | CO2 | L2 | 1M |
|  | g) | | | Define notch and classify the notches. | CO3 | L1 | 1M |
|  | h) | | | List out the advantages of triangular notch over rectangular notch. | CO3 | L2 | 1M |
|  | i) | | | What is advantage of venturimeter over orifice meter? | CO3 | L1 | 1M |
|  | j) | | | Define small orifice and large orifice. | CO3 | L1 | 1M |
|  | k) | | | Classify all losses in pipes | CO4 | L1 | 1M |
|  | l) | | | Define H.G.L and T.E.L. | CO4 | L2 | 1M |
|  | m) | | | Write the relation between friction factor with Reynolds’s number | CO4 | L1 | 1M |
|  | n) | | | State any two reasons for minor losses in pipes. | CO4 | L1 | 1M |
|  | | **Unit - I** | | | | | |
| 2. | a) | | Derive Pascal’s law? and give examples. | | CO1 | L3 | 7M |
|  | b) | | Explain various types of manometers with neat sketches. | | CO1 | L1 | 7M |
|  | | **(OR)** | | | | | |
| 3. | a) | | A simple manometer ( U-Tube) containing mercury is connected to a pipe in which an oil of specific gravity 0.9 is flowing. The pressure in the pipe is below atmospheric pressure. The other end of the manometer is open to atmosphere. Find the pressure in the pipe. If the difference of mercury level in the two limbs is 280 mm and height of oil in the left limb from the centre of the pipe is 180 mm below. | | CO1 | L4 | 7M |
|  | b) | | Derive force exerted on a vertical plane surface.. | | CO1 | L2 | 7M |
|  | | **Unit - II** | | | | | |
| 4. | a) | | Derive Bernoulli’s equation. State its assumptions. | | CO2 | L2 | 7M |
|  | b) | | Derive three-dimensional continuity equation. | | CO2 | L3 | 7M |
|  | | **(OR)** | | | | | |
| 5. | a) | | Differentiate between   1. Rotational and Irrotational Flow. 2. Steady and Unsteady Flow. 3. Uniform and Non-Uniform Flow 4. Laminar and turbulent Flow | | CO2 | L3 | 7M |
|  | b) | | An oil of sp. gr. 0.8 is flowing through a venturimeter having inlet diameter of 200 mm and throat diameter of 10 cm. The oil-mercury differential manometer shows a reading of 300 mm. Calculate the discharge of oil through the horizontal venturimeter. Take Cd = 0.98 | | CO2 | L3 | 7M |
|  | | **Unit - III** | | | | | |
| 6. | a) | | Differentiate between orifice and mouth piece with neat sketches along with examples. | | CO3 | L2 | 7M |
|  | b) | | Derive large rectangular orifice. | | CO3 | L3 | 7M |
|  | | **(OR)** | | | | | |
| 7. | a) | | Derive the expression for discharge through a triangle notch. | | CO3 | L2 | 7M |
|  | b) | | A rectangular notch of length 40 m has a height of 40 cm of water above the crest. Find the discharge. Take Cd = 0.6. | | CO3 | L3 | 7M |
|  | | **Unit - IV** | | | | | |
| 8. | a) | | State the Momentum equation and derive the force exerted by flowing fluid on a pipe bend. | | CO4 | L1 | 7M |
|  | b) | | A pipe of diameter 300 mm and length 1000m connects two reservoirs, having difference of water levels as 15 m. Determine the discharge through the pipe. If an additional pipe of diameter 300 mm and length 600 m is attached to the last 600 m length of the existing pipe, find the increase in the discharge. Take friction factor f=0.02 and neglect minor losses | | CO4 | L2 | 7M |
|  | | **(OR)** | | | | | |
| 9. | a) | | A horizontal water pipe fitted with a 900 bend reducer. The pressure at the inlet is 150KPa where its cross-sectional area is 0.015m2. If at the exit section, the velocity is 18m/s, the area is 0.0025m2 and the pressure is atmospheric, then determine the resultant force exerted on the bend and its direction. | | CO4 | L3 | 7M |
|  | b) | | Describe briefly Reynolds experiment with neat sketch in pipe flow? | | CO4 | L1 | 7M |

