Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **17CE2004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MECHANICS OF FLUIDS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | State and Explain Newton’s law of Viscosity. | CO1 | 5 |
| b. | A velocity distribution over a plate is given by 2 in which u is the velocity in m/sec at a distance of y m above the plate. Determine the shear stress at y = 0,0.1 and 0.2m. Take = 6 poise. | CO1 | 15 |
| (OR) | | | | |
| 2. | a. | Define the term: Total pressure and Centre of Pressure. | CO2 | 5 |
| b. | A circular plate 3 m diameter is immersed in water in such a way that its greatest and least depth below the free surface are 4m and 1.5m respectively. Determine the total pressure on one face of the plate and position of the centre of pressure. | CO2 | 15 |
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| 3. | a. | The diameters of a pipe at the sections 1 and 2 are 15cm and 20 cm respectively. Find the discharge through the pipe if velocity of water at section 1 is 4m/s. Determine also the velocity at section 2. | CO3 | 6 |
| b. | A fluid flow field is given by    Prove that it is a case of possible steady incompressible fluid flow. Calculate the velocity and acceleration at the point (1,2,3) | CO3 | 14 |
| (OR) | | | | |
| 4. | a. | Define Continuity equation and Bernoulli’s equation. | CO3 | 6 |
| b. | Water is flowing through a pipe having diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm2 and the pressure at the upper end is 9.81 N/cm2. Determine the difference in head if the rate of flow through pipe is 40 lit/s. | CO3 | 14 |
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| 5. |  | A venturimeter is installed in a 300mm diameter horizontal pipe line. The throat pipe rates is 1/3. Water flows through the installation. The pressure in the pipe line is 13.783 N/cm2(Gauge) and vacuum in the throat is 37.5 cm of mercury. Neglecting head loss in the venturimeter, determine the rate of flow in the pipe line. | CO4 | 20 |
| (OR) | | | | |
| 6. |  | The following are the data given of a change in diameter effected in laying a water supply pipe. The change in diameter is gradual from 20cm at A to 50cm at B. Pressure at A and B are 7.848 N/cm2 and 5.886 N/cm2 respectively with the end B being 3m higher than A. If the flow in the pipe line is 200lit/se. Find: (i) direction of flow (ii) the head lost in friction between A and B. | CO4 | 20 |
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| 7. |  | A horizontal pipe line 40m long is connected to a water tank at one end and discharge freely into the atmosphere at the other end. For the first 25m of its length from the tank, the pipe is 150mm diameter and its diameter is suddenly enlarged to 300mm. The height of water level in the tank is 8m above the centre of the pipe. Considering all losses of head which occur, determine the rate of flow. Take f= 0.01for both sections of the pipe. | CO4 | 20 |
| (OR) | | | | |
| 8. |  | A syphon of diameter 200mm connects two reservoir having a difference in elevation of 15m. The length of the siphon is 600m and the summit is 4 m above the water level in the upper reservoir. If the separation takes place at 2.8m of water absolute, find the maximum length of syphon from upper reservoir to the summit. Take f= 0.004 and atmospheric pressure = 10.3m of water. | CO5 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | Find the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by 2 | CO6 | 20 |