

undefined

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Summer 2019

Course: B. Tech in Mechanical Engineering

Sem: III

Subject Name: Fluid Mechanics

Subject Code: BTMEC303

Max Marks: 60

Date: 30/05/2019

Duration: 3 Hr.

**Instructions to the Students:**

1. Solve ANY FIVE questions out of the following.
2. The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

- Q.1 A) Explain with the neat sketch U-tube differential Manometer. 6
- B) A vertical gap 2.2cm wide of infinite extent contains a fluid of viscosity  $2.0\text{Ns/m}^2$  and specific gravity 0.9. A metallic plate  $1.2\text{m} \times 1.2\text{m} \times 0.2\text{cm}$  is to be lifted up with a constant velocity of  $0.15\text{m/sec}$ , through the gap. If the plate is in the middle of the gap, find the force required. The weight of the plate is  $40\text{N}$ . 6
- Q.2 A) Explain with the neat sketch the condition for equilibrium for floating bodies. 6
- B) A rectangular plane surface is  $2\text{m}$  wide and  $3\text{m}$  deep. It lies in vertical plane to water. Determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and a) coincides with water surface, b)  $2.5\text{m}$  below the free water surface. 6
- Q.3 A) Derive the general equation for continuity for a three dimensional flow in Cartesian Co-ordinates for a steady incompressible flow. 6
- B) Explain the various types of fluid flows. 6
- Q.4 A) Derive the expression for discharge over a triangular notch. 6
- B) Describe an Venturimeter. 6
- Q.5 A) Prove that the maximum velocity in a circular pipe for viscous flow is equal to two times the average velocity of the flow. 6
- B) What is minor energy loss in the pipe? Explain various types of minor losses in pipe flow. 6
- Q.6 A) State Buckingham's  $\pi$ -Theorem and explain procedure for determining the  $\pi$ -groups and their functional relationship. 6
- B) What are the different methods of preventing the separation of boundary layers. Explain with the neat sketches. 6

\*\*\* End \*\*\*

