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S.E. (Mechanical/Automobile) (I Sem.) EXAMINATION, 2018 FLUID MECHANICS (2012 PATTERN)

Time: Two Hours

Maximum Marks: 50

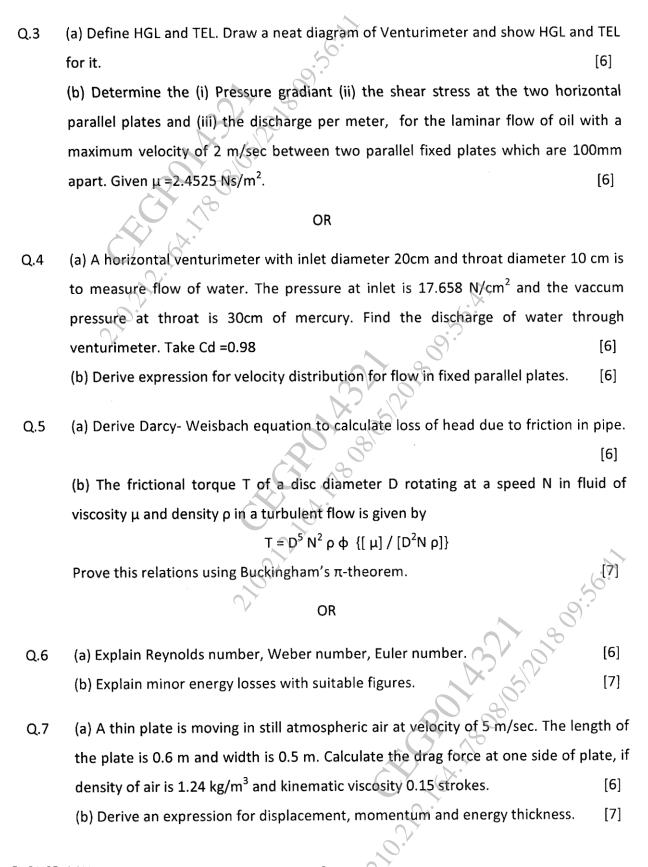
- **N.B.** :— (1) Answer four questions out of 8.
 - (ii) Attempt Q. Nos. 1 or 2, Q. Nos. 3 or 4, Q. Nos. 5 or 6 and Q. Nos. 7 or 8.
 - (iii) All questions should solve in one answer-book and attach extra supplements if required.
 - (iv) Draw diagrams wherever necessary.
 - (v) Use of scientific calculator is allowed.
 - (vi) Assume suitable data wherever necessary.
 - Q.1 (a) Derive an expression for total pressure and center of pressure for inclined plane submerged in liquid and hence derive expression for center of pressure for vertical plane.
 - (b) The velocity distribution for flow over a flat plate is given by $u = [3/4]y y^2$ in which u is the velocity in m/sec at a distance y meter above the plate. Determine the shear stress at y = 0.15m. Take dynamic viscosity of fluid is 8.6 poise. [6]

OR

- Q.2 (a) State and explain Newton's law of viscosity. Explain the importance of viscosity in fluid motion. [6]
 - (b) Explain Velocity potential, Stream function, Vorticity.

P.T.O.

[6]



Q.8 (a) Discuss the boundary layer formation over a flat plate.

[6]

(b) A flat plate $1.5m \times 1.5m$ moves at 50 km/hour in stationary air of density 1.15 kg/m³. If the co-efficients of drag and lift are 0.15 and 0.75 respectively determine The lift force, The drag force, The resistance force and Power required to keep the plate in motion. [7]

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