D 51475 (Pages 3) Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2008

ME/AM 04 303—FLUID MECHANICS

(2004 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*
Missing data may be assumed suitably.

1. (a) Develop the expression for the relationship between the gauge pressure P inside a droplet of liquid and the surface tension.

   (b) What are the conditions of equilibrium of a floating body and a submerged body ?

   (c) The diameter of the pipe varies from 10 cm to 15 cm from section 1 to section 2. Find the ratio of velocity at section 1 and 2.

   (d) Discuss the relative merits and demerits of venturimeter with respect to orifice-meter.

   (e) Differentiate the methods of Eulerian and Lagrangian of describing fluid flow.

   (f) Name the minor losses occurring in pipes.

   (g) What do you mean by Prantls mixing length theory ?

   (h) Define :

   (i) Boundary layer thickness.

   (ii) Momentum thickness.

(8 ×5 = 40 marks)

2. (a) Derive an expression for metacentric height. (7 marks)

   (b) Find the magnitude and direction of the resultant force due to water acting on a roller gate of cylindrical form of 4 m diameter, when the gate is placed on the dam in such a way that water is just going to spill. Take length of the gate as 8 m.

(8 marks)

Or

3. (a) Define compressibility. Prove t hat compressibility for a gas undergoing isentropic compression is $\frac{1}{\omega p}$ where ω = specific weight of the gas.

(7 marks)

Turn over