KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food. Engg) 2011 Admission
III rd Semester Final Examination- January/February -2013

Cat. No: Cien.2103

Title: Fluid Mechanics (2+1)

Marks: 80

Time: 3 hours

I. Match the following   [10 x 1 = 10 marks]

1. Kinematic viscosity	a. Pitot tube
2. Cavitation,	b. Meta centre
3. 1 bar	c. Manometer
4. 1 poise	d. Centrifugal pump
5. Velocity measurement	e. Water meter
6. Pressure measurement	f. Piston pump
7. Buoyancy	g. 10^5 N/m^2
8. Variable displacement pump	h. (0.1) N. s/m^2
9. Positive displacement pump	i. Stoke
10. Discharge measurement	j. Vapour pressure

II. Write short notes on **ANY TEN** of the following.   [10 x 3 = 30 marks]

1. Turbulent flow
2. Newton's law of viscosity
3. Eddy viscosity
4. Bernoulli's equation
5. Pitot tube
6. Continuity Equation
7. Priming of pump
8. Orifice meter
9. Specific Speed of pump
10. Ergun equation
11. Terminal settling velocity
12. Hagen Poiseulle Equation

III. Answer **ANY SIX** of the following questions   [6 x 5 = 30 marks]

1. Explain the relationship between absolute pressure, vacuum Pressure and atmospheric pressure.

2. Distinguish between
   a). Real fluid and Ideal fluid
   b). Surface tension and capillarity
   c). Stream line and streak line

3. Determine the specific gravity of a fluid having viscosity 0.05 poise and kinematic viscosity 0.035 stokes.

4. Discuss the conditions of equilibrium of a floating and a submerged body.

5. Derive the expression for discharge through a venturimeter.

6. Find the velocity of the flow of an oil through a pipe, when the difference of mercury level in a differential U-tube manometer to the two tappings of the pitot tube is 100mm. Take coefficient of pitot tube as 0.98 and specific gravity of oil as 0.8.

7. Make a comparison between centrifugal pump and jet pump.

8. An oil with specific gravity = 0.85 and kinematic viscosity = 1.8×10^{-5} m^2/s flows in a 10 cm diameter pipe at 0.50 litres/sec. Is the flow laminar or turbulent?

IV. Answer ANY ONE of the following   [1 x 10 = 10 marks]

1. Give a detailed classification of different types of discharge measuring devices. Explain in detail how you would measure the discharge with orifice meter. Also mention the circumstances under which orifice meter is preferred over the other meters.

2. a).Derive the continuity equation in three dimensions.

   b).A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm pipe is 2.5 m/s, find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s.