

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 2

Total No. of Questions : 09

B.Tech. (AE) (Sem.-4<sup>th</sup>)  
**FLUID MECHANICS & MACHINERY**  
Subject Code : AE-206  
Paper ID : [A0711]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- (a) Define bulk modulus.
- (b) What is hydrostatic pressure?
- (c) Define metacentric height.
- (d) Define path lines.
- (e) What is flow net?
- (f) Write the expression for impulse momentum equation.
- (g) Draw the sketch of a rotameter.
- (h) What is dimensional analysis.
- (i) Write the dimensions of pressure.
- (j) Define the principle of operation of reciprocating pump.

**SECTION-B**

2. What is fluid? Explain the different types of fluids in brief.
3. Derive an expression for the meta centric height of a floating body.
4. Define fluid kinematics. Derive an expression for the continuity equation in Cartesian coordinates.
5. Derive an expression for Bernoulli's equation. Also state the assumptions.
6. A solid cylinder of diameter 4m has a height of 4m. Find the meta centric height of the cylinder if the specific gravity of the material of cylinder is 0.6 and it is floating in water with its axis vertical. State whether the equilibrium is stable or unstable?

**SECTION-C**

7. (a) State and derive the expression for Buckingham's  $\pi$  theorem.  
(b) Discuss the various flow regimes. Also explain what is Reynolds's number.
8. A pipe line which is 4m in diameter contains a gate valve. The pressure at the centre of the pipe is  $19.6 \text{ N/cm}^2$ . If the pipe is filled with the oil of specific gravity 0.87, find the force exerted by the oil upon the gate and position of centre of pressure.
9. (a) State and explain the principle of working of a fluid coupling and torque converter.  
(b) Write a short note on turbo blowers.