

Roll No. ....

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (AE) (Sem.-4)**  
**FLUID MECHANICS AND MACHINERY**  
**Subject Code : AE-206**  
**Paper ID : [A0711]**

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A is COMPULSORY.**
2. **Attempt any FOUR questions from SECTION-B.**
3. **Attempt any TWO questions from SECTION-C.**

**SECTION-A (10 × 2 = 20 Marks)**

1. a) Define Specific weight of fluid.  
b) Differentiate between vacuum pressure and Gauge pressure.  
c) What is buoyancy force?  
d) Differentiate between rotational and rotational fluid.  
e) Write the formula of discharge through orifice meter.  
f) What is the basic principle of momentum conservation?  
g) Define Metacentric height?  
h) What do you mean by dynamic similarity.  
i) Differentiate between energy and head.  
j) Draw the velocity profile of flow through pipe for turbulence flow.

**SECTION-B (4 × 5 = 20 Marks)**

2. Define Notches and its types. Derive an expression for the discharge through a rectangular notch.
3. Define the terms “pressure intensity” and “pressure head”. Give the relation between them.
4. State and prove Newton’s law of viscosity. Also differentiate between Newtonian and non-Newtonian fluid.

4. A crude oil of viscosity 0.9 poise and relative density 0.9 is flowing through a horizontal circular pipe of diameter 120mm and length 12m. Calculate the difference of pressure at the two ends of the pipe, if 785N of the oil is collected in a tank in 25 seconds.
5. Draw a detailed diagram of “inverted U-tube differential manometer”. Under what pressure conditions it can be used?
6. Draw a neat sketch of venturimeter. State why the length of divergent cone is made longer?

**SECTION-C**                      **(2 × 10 = 20 Marks)**

7. Define the following terms regarding a system with flowing liquid :
  - a) Elevation head, pressure head and velocity head.
  - b) Static pressure, dynamic pressure, total pressure, Energy loss and head loss.
8. The diameter of horizontal pipe which is 300mm is suddenly enlarged to 600mm. The rate of flow of water through this pipe is  $0.4\text{m}^3/\text{sec}$ . If the intensity of pressure in the smaller pipe is  $125\text{KN}/\text{m}^2$ , determine:
  - a) loss of head due to sudden enlargement.
  - b) Intensity of pressure in the larger pipe.Power lost due to enlargement.
9. Derive an expression for the depth of centre of pressure of a vertically immersed surface.