

V61/T11041/EE/20160709

Time : 3 Hours

Marks : 80

Instructions :

1. All Questions are Compulsory.
 2. Each Sub-question carry 5 marks.
 3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
 4. Question paper of 80 Marks, it will be converted in to your programme structure marks.
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1. Solve any **four** sub-questions.
 - a) Explain Total pressure and Center of pressure. 5
 - b) State and explain Pascal's law. 5
 - c) A circular plate of 3m diameter is immersed in water such that its plane is vertical and is tangential to the water surface find total pressure and position of center of pressure. 5
 - d) Give the characteristics of velocity potential function. 5
 - e) Derive 3 dimensional continuity equation. 5
2. Solve any **four** sub-questions.
 - a) Write a short note on dimensional analysis significance. 5
 - b) Determine the total pressure and centre of pressure on an isosceles triangular plate of base 4m and altitude 4m when it is immersed vertically in an oil of s pgr.0.9 such that base of the plate coincides with the free surface of oil. 5
 - c) What do you understand by the term stream function? 5
 - d) Explain U tube manometer with neat sketch. 5
 - e) What do you understand by laminar and turbulent flow? 5

3. Solve any **four** sub-questions.
- a) Water is flowing through the pipe of 5cm diameter under a pressure of 29.43N/sqcm AND with a mean velocity of 2m/s. Find the total head if pipe is 5m above the datum. 5
 - b) Define various hydraulic coefficients of orifices. 5
 - c) Obtain the equations for excess pressure inside soap bubble and liquid drop. 5
 - d) Explain the working of venturimeter and obtain an expression for discharge. 5
 - e) $V = 4x^3i - 10x^2yj + 2tk$ find velocity and acceleration of the particle at (2, 1, 3) and $t = 1$. 5
4. Solve any **four** sub-questions.
- a) A pitot static tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 6m and static pressure head is 5m. Find velocity of flow. 5
 - b) With the help of neat and labeled diagram explain Meta-Centre and metacentric height. 5
 - c) Derive an expression for metacentric height. 5
 - d) A horizontal venturimeter with inlet and throat diameters 30cm and 15cm respectively. If reading of mercury manometer is 20cm of mercury. Determine the rate of flow $C_D = 0.98$. 5
 - e) Explain steady and unsteady flow. 5

