

# FLUID MECHANICS (COMMON TO CV/TR/EV)

Written by Administrator

Friday, 23 October 2009 11:23 - Last Updated Friday, 23 October 2009 11:29

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**Sub Code**

:

**06 CV 35**

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**IA Marks**

:

**25**

**Hrs/ Week**

:

**04**

□

## **Exam Hours**

:

**03**

**Total Hrs.**

:

**52**

□

**Exam Marks**

:

**100**

**PART – A**

**UNIT 1:**

**INTRODUCTION**□□□□□□□□□□□□□□□□

1.1 Scope and importance of Subject, 1.2 Definition of Fluid, Distinction between solids & fluid, 1.3 Distinction between liquid & gas fluid continuum.

**FLUID PROPERTIES AND CLASSIFICATION OF FLUID**

1.4 Mass density, Specific Volume, 1.5 Specific Weight Relative density, 1.6 Definition, units and Dimensions, 1.7 Viscosity, Newton's law of viscosity, 1.8 Newtonian and Non-Newtonian Fluids, 1.9 Ideal and Real fluids, 1.10 Compressibility, 1.11 Vapour pressure, 1.12 surface tension, Definitions, units and dimensions, 1.13 Equation for stability of bubble, 1.14 Capillarity, theory and problems, 1.15 Problems on Newton's law of viscosity.

**9 Hours**

**UNIT 2:**

**FLUID PRESSURE AND ITS MEASUREMENT** □□□□□□□□□□□□□□□□□□□□

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1.1 Definition of pressure, units and dimensions, 2.2 Pressure at a point, 2.3 Pascal's law, 2.4 Hydrostatic pressure law, 2.5 Absolute and Gauge pressure, 2.6 Measurement of pressure, Simple Manometer theory and problems, 2.7 Differential manometer theory & Problems, 2.8 Mechanical pressure gauges. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

**6 Hours**

**UNIT-III**

**HYDROSTATICS** □□□

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1.1 Definition of total pressure, Center of pressure, Centroid, centroidal depth, depth of center of pressure, 3.2 Equation for hydrostatic force and depth of center of pressure on plane surfaces (vertical and inclined), 3.3 Problems on hydrostatic force vertically submerged surfaces 3.4 Problems on inclined submerged surfaces, 3.5 Hydrostatic force on submerged curved surfaces, problems, 3.6 Pressure diagram, problems

**6 Hours**

**UNIT 4:**

**KINEMATICS OF FLUIDS** □□□

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1.1 Description of fluid flow, 4.2 Lagrangian and Eulerian approaches. 4.3 Classification of flow, steady & unsteady, uniform and non-uniform, 4.4 Definition of path line, streamline, streak line, stream tube, one, two, three dimensional flows. Rotational and irrotational flow, 4.5 Acceleration of flow, 4.6 One dimensional flow, derivation of continuity equation in differential form, 4.7 Definition of velocity potential, stream functions, stream line, equipotential line, 4.8 Relation between velocity potential and stream function, Laplace equation. 4.9 Problem on continuity equation, 4.10 Problem on velocity potential and stream function.

**7 Hours**

## **PART – B**

### **UNIT 5: DYNAMICS OF FLUID FLOW** □□□□□□□□□□□□□□□□□□

5.1 Concept of Inertia force and other forces causing motion, 5.2 Derivation of Euler’s equation and Bernoulli’s equation with assumption and limitation. 5.3

Modification of Bernoulli’s equation, problem on Bernoulli’s equation without and with losses. 5.4 Application of Bernoulli’s equation - Pitot tube, problems 5.5 Venturimeter, problems. 5.6 Momentum equation, problems





## **TEXT BOOKS :**

1. **Hydraulics and Fluid Mechanics** by P.N. Modi and S.M. Seth  
Standard Book House, New  
Delhi.
2. **Fluid Mechanics and Hydraulic Machines** by Dr. R.K. Bansal, L  
akshmi  
  
Publications, New Delhi.
3. **“Fluid Mechanics”**, Jain, A.K., Khanna Publishers, New Delhi.



## **REFERENCE BOOKS :**

1. **Elementary Hydraulics (1<sup>st</sup> Edition)** James F Cruise, Vijay P. Singh, Mohsan M. Sherif, Thomson Learning.
2. **Fluid Mechanics, Hydraulic and Hydraulics** by K.R. Arora, Standard Book House, New Delhi.
3. **Fluid Mechanics**, John F. Douglas et al., Pearson Education, India.