Scheme of Examination:

Two questions to be set from each Part-A, Part-B and Part-C
Student has to answer one question each from Part-A and Part-B for 20 marks each. And one question from Part-C for 60 marks.

i.e.	**PART-A 1 x 20**	**= 20 Marks**
	PART-B 1 x 20	**= 20 Marks**
	PART-C 1 x 60	**= 60 Marks**
	Total	**= 100 Marks**

FLUID MECHANICS

Sub Code	**: 10ME 36B / 46B**	**IA Marks**	**: 25**
Hrs/week	**: 04**	**Exam Hours**	**: 03**
Total Lecture Hrs	**: 52**	**Exam Marks**	**: 100**

PART – A

UNIT-1

Properties of Fluids: Introduction, Types of fluid, Properties of fluids, viscosity, thermodynamic properties, surface tension, capillarity, vapour pressure and cavitation

06 Hours

UNIT-2

Fluid Statistics : Fluid pressure at a point, Pascal's law, pressure variation in a static fluid, absolute, gauge, atmospheric and vacuum pressures, simple manometers and differential manometers. Total pressure and center of pressure on submerged plane surfaces; horizontal, vertical and inclined plane surfaces, curved surface submerged in liquid.

07 Hours

UNIT-3

Buoyancy and Fluid Kinematics:
Buoyancy, center of buoyancy, metacentre and metacentric height, conditions of equilibrium of floating and submerged bodies, determination of Metacentric height experimentally and theoretically.
Kinematics: Types of fluid flow, continuity equation in 2D and 3D (Carversian Co-ordinates only, velocity and acceleration, velocity potential function and stream function.

07 Hours

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UNIT-4

Fluid Dynamics: Introduction equation of motion, Euler's equation of motion, Bernoulli's equation from first principles and also from Euler's equation, limitations of Bernoulli's equation.

06 Hours

PART-B

UNIT-5

Fluid Flow Measurements : Venturimeter, orificemeter, pitot-tube, vertical orifice, V-Notch and rectangular notches.
Dimensional Analysis : Introduction, derived quantities, dimensions of physical quantities, dimensional homogeneity, Rayleigh's method, Buckingham π theorem, dimensionless numbers, similitude, types of similtudes.

07 Hours

UNIT-6

Flow through pipes : Minor losses through pipes. Darey's and Chezy's equation for loss of head due to friction in pipes. HGL and TEL.

06 Hours

UNIT-7

Laminar flow and viscous effects : Reyonold's number, critical Reynold's number, laminar flow through circular pipe-Hagen Poiseille's equation, laminar flow between parallel and stationary plates.

06 Hours

UNIT-8

Flow past immersed bodies : Drag, Lift, expression for lift and drag, boundary layer concept, displacement, momentum and energy thickness.
Introduction to compressible flow : Velocity of sound in a fluid, Mach nuber, Mach cone, propagation of pressure waves in a compressible fluid.

07 Hours

TEXT BOOKS:

1. **Fluid Mechanics,** Oijush.K.Kundu, IRAM COCHEN, ELSEVIER, 3rd Ed. 2005.
2. **Fluid Mechanics,** Dr. Bansal, R.K.Lakshmi Publications, 2004.

REFERENCE BOOKS:

1. **Fluid Mechanics and hydraulics,** Dr.Jagadishlal: Metropolitan Book Co-Ltd., 1997.
2. **Fluid Mechanics (SI Units),** Yunus A. Cengel John M.Oimbala, 2nd Ed., Tata McGraw Hill, 2006.

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3. **Fluid Mechanics,** John F.Douglas, Janul and M.Gasiosek and john A.Swaffield, Pearson Education Asia, 5th ed., 2006

4. **Fluid Mechanics and Fluid Power Engineering,** Kumar.D.S, Kataria and Sons., 2004

5. **Fluid Mechanics** -, Merle C. Potter, Elaine P.Scott. Cengage learning

METALLOGRAPHY AND MATERIAL TESTING LABORATORY

Sub Code	**: 10MEL 37A / 47A**	**IA Marks**	**: 25**
Hrs/week	**: 03**	**Exam Hours**	**: 03**
Total Lecture Hrs	**: 48**	**Exam Marks**	**: 50**

PART – A

1. Preparation of specimen for Metallograpic examination of different engineering materials. Identification of microstructures of plain carbon steel, tool steel, gray C.I, SG iron, Brass, Bronze & composites.
2. Heat treatment: Annealing, normalizing, hardening and tempering of steel. Hardness studies of heat-treated samples.
3. To study the wear characteristics of ferrous, non-ferrous and composite materials for different parameters.
4. Non-destructive test experiments like,
   (a). Ultrasonic flaw detection
   (b). Magnetic crack detection
   (c). Dye penetration testing. To study the defects of Cast and Welded specimens

PART – B

1. Tensile, shear and compression tests of metallic and non metallic specimens using Universal Testing Machine
2. Torsion Test
3. Bending Test on metallic and nonmetallic specimens.
4. Izod and Charpy Tests on M.S, C.I Specimen.
5. Brinell, Rockwell and Vickers's Hardness test.
6. Fatigue Test.

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