FACULTY OF ENGINEERING
B.E. 2/4 (Civil) II – Semester (Main) Examination, June 2014

Subject : Fluid Mechanics – I

Time : 3 hours   Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.
PART – A (25 Marks)

1	Define the terms a) specific weight b) capillarity c) density of a fluid.	3
2	Explain the terms Metacentre and Metacentric height.	2
3	Distinguish between i) steady and unsteady flow ii) laminar and turbulent flow.	3
4	Define the terms Forced Vortex flow and Free Vortex flow.	2
5	Draw a neat sketch of Rotameter.	3
6	Define and explain the terms Mach number, Froude number, Reynolds number	3
7	What do you mean by viscous flow?	2
8	Differentiate between subsonic and supersonic flows.	2
9	Two horizontal plates are placed 1.25 cm apart, the space between them being filled the oil of viscosity 14 poise. Calculate the shear stress in oil, if upper plate is moved with a velocity of 2.5 m/s.	3
10	Find the discharge over a triangular notch of angle 60^0 when the head over the notch is 0.3 m. Assume C_d = 0.6.	2

PART – B (50 Marks)

11	a) State and prove Pascal's law.	6
	b) A wooden block of width 2m, depth 1.5m and length 4m floats horizontally in water. Find the volumes of watch displaced and position of centre buoyancy, the specific gravity of wood is 0.7.	4
12	250 lit/s of water is flowing in a pipe having diameter 300mm. If the pipe is bent by 135^0. Find the magnitude and direction of resultant force on the bend. The pressure of watch flowing is 39.24 M/cm^2.	10
13	a) Explain briefly the working principle of Bourdon pressure gauge with a neat sketch.	4
	b) A pipe contain an oil or specific gravity 0.8. A differential manometer connected at the two point A and B of a pipe shows the difference in mercury level as 20cm. Find the difference of pressure at the two points.	6
14	State Bernoulli's theorem for compressible flow. Derive an expression for Bernoulli's equation when the process is adiabatic.	10
15	Derive an expression for the loss of head due to friction in pipes and derive Darcy-Weisbach equation.	10
16	a) Define the terms path line, stream line, streak line stream tube.	6
	b) Derive an expression for discharge over stepped notch.	4
17	Write short notes on :	
	i) Partial flumes ii) Micro manometers iii) Rotameter	4+3+3

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