s.t I

G.R. No.

paper code: U228-113 (RE-FF)

MAY 2019/ENDSEM RE-EXAM

S. Y. B. TECH. (Civil) (SEMESTER - II)

COURSE NAME: Fluid Mechanics - I
COURSE CODE: CVUA 22173
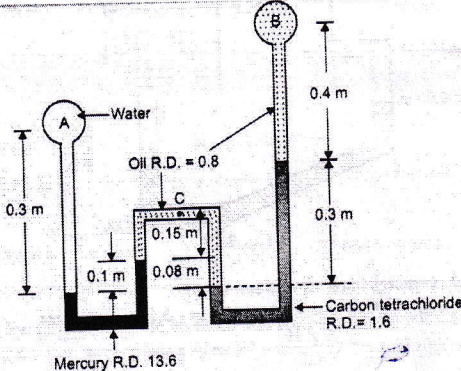
(PATTERN 2017)

Time: [**2 Hours**]   [Max. Marks: **50**]

(*) Instructions to candidates:
1) Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed
4) Use suitable data where ever required

Q.1)	a)	A U tube is made up of two capillary tubes; one 2 mm and other 4 mm in diameter. The tube is vertical and partially filled with water of surface tension 0.0736 N/m and zero angle of contact. Calculate the difference of levels in the tube.	6
		OR	
	b)	A cube of 0.3 m sides and mass 30 kg slides down a plane inclined at 30° to the horizontal and covered by a thin film of viscosity 2.3 x 10-3 Ns/m2. If the thickness of the film is 0.03 mm determine the speed of the block.	6
Q.2)	a)	Determine pressure difference between A and B and A and C in terms of kN/m^2	6
		OR	
	b)	Discuss stability of submerged bodies and stability of floating bodies with help of sketches.	6

Q.3)	a)	What is flow net? What are the methods of drawing flow net? Explain electrical analogy method for drawing flow net	6
		OR	
	b)	Define rotation. Write equations for components of rotation. Prove that vorticity is equal to twice the rotation component per unit area	6
Q.4)	a)	Find out discharge through a Venturimeter with inlet diameter of 10 cm and throat diameter of 5 cm carrying oil of specific gravity 0.8 when the deflection of oil mercury manometer is 30 cm. Assume coefficient of the meter as 0.95	4
		OR	
	b)	Classify Orifice according to shape, nature of edge, size and condition of discharge. Draw sketches to supplement your answer	4
Q.5)	a)	A smooth flat plate is exposed to wind velocity of 6 km/minute. If the laminar boundary exists upto a value of Re=2 x 10^6 find the maximum distance upto which laminar boundary layer exists and its maximum thickness. Assume kinematic viscosity of air = $1.5*10^{-5}$ m^2/s	6
	b)	Define nominal thickness, displacement thickness, momentum thickness and laminar sub-layer of boundary layer	4
	c)	Calculate the loss of head in a pipe having diameter of 15 cm and length of 2 km. It carries laminar flow of oil of specific gravity 0.85 and viscosity of 6 stokes at the rate of 30.48 lps	4
		OR	
Q.6)	a)	Prove that velocity distribution for the steady laminar flow between fixed parallel plates is parabolic	6
	b)	Explain boundary layer separation and its control	4
	c)	Draw a neat sketch of Redwood viscometer showing all parts	4
Q.7)	a)	Two pipes are connected in parallel. Following are the details of these pipes	6

	Diameter	Length	Friction Factor
Pipe A	0.75m	1000m	0.018
Pipe B	1m	750m	0.020

If total discharge of 1 m^3/s is distributed into pipe A and B, determine the discharge in each pipe

	b)	Write step by step procedure for Hardy Cross method of pipe network analysis	4
	c)	Discuss three reservoir problem.	4
		OR	
Q.8)	a)	What are various losses in the pipe? Give the expression for each.	6
	b)	A compound piping system consists of 1800 m of 50cm, 1200 m of 40 cm and 600 m of 30 cm diameter pipes of the same material connected in series. What is the equivalent length of a 40cm pipe of the same material	4
	c)	Write short note on Hydrodynamically smooth and rough pipes	4