Code No: P18CET04

R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
FLUID MECHANICS
(CE Branch)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

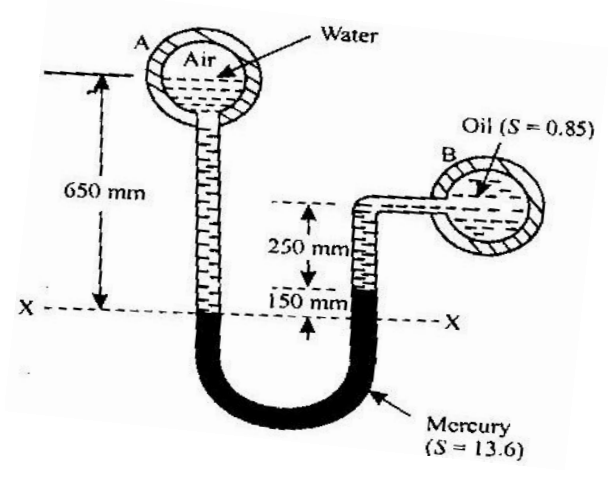
PART-A

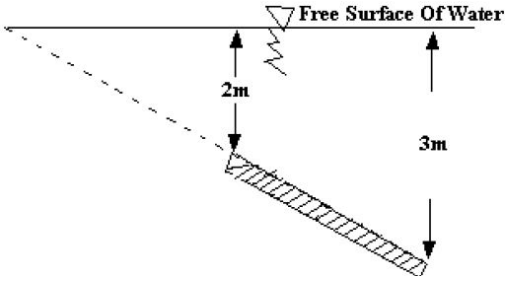
Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1	a)	Differentiate between fluid kinematics and fluid dynamics.	[2M]	1	
	b)	Distinguish between center of pressure and total pressure force.	[2M]	2	
	c)	State momentum equation and mention some of its engineering applications.	[2M]	3	
	d)	Differentiate between hydraulic gradient line and total energy line.	[2M]	4	
	e)	What do you understand by the terms of boundary layer theory and boundary layer?	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	Explain the phenomena of the capillarity. Obtain an expression for capillarity rise of a liquid	[5M]	1	
	b)	The velocity distribution for flow over a flat plate is given by $u=\frac{3}{2}y-y^{3/2}$, where u is the point velocity in meter per second at a distance y meter above the plate. Determine the shear stress at y = 0.2m. Assume dynamic viscosity 8 poise.	[5M]	1	
		OR			
3.		Figure shows a differential manometer connected at two points A and B. At air pressure is 100 kN/m^2. Find the absolute pressure at B. 	[10M]	1	
		UNIT-II			

4.		A circular plate 2.5m in diameter is submerged in water as shown in figure 1.0 Its greatest and least depths below free surface of water are 3m and 2m respectively. Find i).Total pressure on front face of the plate and ii).the position of centre of pressure. 	[10M]	2	
OR					
5.	a)	Explain the fallowing teams and give one example each (i). Stream line (ii). Path line (iii). Streak line	[3M]	2	
	b)	The stream function for a two-dimensional flow is given by ψ =3xy, calculate the velocity at the point P (2, 3). Find the velocity potential function ϕ	[7M]	2	
UNIT-III					
6.		Derive Euler's equation of motion acting along a stream line. Obtain Bernoulli's equation by its integration. List all assumptions made.	[10M]	3	
OR					
7.		Derive Force exerted by a flowing fluid on a pipe- bend using Impulse-momentum equation	[10M]	3	
UNIT-IV					
8.		Derive an expression for the head loss due to sudden enlargement in pipe flow	[10M]	4	
OR					
9.	a)	What do you mean by pipes in parallel and pipes in series? Why pipes are used in parallel?	[5M]	4	
	b)	An oil of sp.gr.0.9 is flowing through a pipe of diameter 300 mm at the rate of 500 lit/sec. Find the head lost due to friction required to maintain the flow for a length of 1500m take γ is 0.3 stokes.	[5M]	4	
UNIT-V					
10.	a)	A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of oil of specific gravity 0.8.The discharge of oil through venturimeter is 60 liters/s. Find the reading of the oil-mercury differential manometer. Take C_d =0.98.	[6M]	5	
	b)	Explain the fallowing terms briefly i) Vena-contracta ii) Orifice iii) Crest iv) Coefficient of Discharge	[4M]	5	
OR					
11.	a)	Derive an expression for the discharge over a triangular notch in terms of head of water over the crest of the notch	[5M]	5	
	b)	Water flows through a rectangular notch 1.5 m width. The co-efficient of discharge of rectangular notch is 0.6. If the depth of water over notch is 500 mm, find the discharge over the rectangular notch.	[5M]	5	

******