C. U. SHAH UNIVERSITY
Winter Examination-2022

Subject Name: Fluid Mechanics-I

Subject Code: 4TE03FLM1   **Branch: B.Tech (Civil)**

Semester: 3   **Date: 10/01/2023**   **Time: 02:30 To 05:30**   **Marks: 70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1		**Attempt the following questions:**	**(14)**
	a)	Define Surface Tension.	(1)
	b)	Define Velocity potential function.	(1)
	c)	What is Laminar flow?	(1)
	d)	Define Stream function.	(1)
	e)	What is Gauge Pressure?	(1)
	f)	What is metacentric height?	(1)
	g)	What is gradient Line?	(1)
	h)	What is an equivalent pipe?	(1)
	i)	What is turbulent flow ?	(1)
	j)	Define Buoyancy.	(1)
	k)	What is Impact of jets?	(1)
	l)	Define Jet propulsion.	(1)
	m)	What is syphon?	(1)
	n)	Define mouth piece.	(1)

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	A	One liter of crude oil weights 9.6 N. Calculate its specific weight, density and specific gravity.	**07**
	B	Differentiate between the following in brief: (i) Laminar flow and Turbulent flow (ii) Steady flow and Unsteady flow.	**07**
Q-3		**Attempt all questions**	**(14)**
	A	Explain analytical method to determine Metacentric height.	**07**
	B	State and prove the Pascal's law.	**07**
Q-4		**Attempt all questions**	**(14)**
	A	Enlist various types of manometers and explain inverted differential	**07**

		manometer in details.	
	B	State the Bernoulli's equation and obtain Bernoulli's equation from Euler's equation of motion.	**07**

Q-5		**Attempt all questions**	**(14)**
	A	Derive continuity equation for 2-D incompressible flow in Cartesian form stating the assumption made and principle involved.	**07**
	B	Derive Bernoulli's equation for steady-incompressible fluid flow. State assumptions made in the derivation.	**07**

Q-6		**Attempt all questions**	**(14)**
	A	The velocity vector in a fluid flow is given V= 4x3 i- 10x2y j+ 2t k Find the velocity and acceleration of fluid particle at (2, 1, 3) at time t=1.	**07**
	B	Write brief notes on following: (i) Narrow crested weir (ii) Ogee weir	**07**

Q-7		**Attempt all questions**	**(14)**
	A	Define hydraulic coefficients for flow through an orifice and derive relationship between these coefficients.	**07**
	B	What is Venturimeter? Derive an expression for the discharge through a Venturimeter.	**07**

Q-8		**Attempt all questions**	**(14)**
	A	Explain jet impingement upon a stationary flat plate.	**07**
	B	Describe various types of fluid flows with examples of each.	**07**