

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2021****Subject Code:3140611****Date:08/09/2021****Subject Name:Fluid Mechanics & Hydraulics****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define fluid, Specific gravity, Mass density	03
	(b) Define viscosity and differentiate between kinematic and dynamic viscosity its ap	04
	(c) Define surface tension. Prove the relationship between surface tension and inside a droplet of liquid in excess of outside pressure is given by $p = 4\sigma/d$.	07
Q.2	(a) Describe the terms atmospheric , absolute, gage and vaccum pressure with sketch	03
	(b) Classify various manometers	04
	(c) State Pascal's law and give some examples where this principle is applied	07
OR		
Q.3	(c) Explain hydrostatic paradox with suitable demonstration	07
	(a) Classify fluid flows.	03
	(b) The velocity potential function is given by $\phi = 5(x^2 - y^2)$. Calculate the velocity components at the point (4, 5)	04
	(c) Explain flow net & Reynolds experiment.	07
OR		
Q.3	(a) Explain the term 'Total Pressure and Centre of Pressure'.	03
	(b) Derive Euler's equation of motion along a stream line.	04
	(c) A horizontal pipe carrying water of 20 cm diameter converges to 10cm diameter. If the pressures at two sections are 450 KN/m ² and 150 KN/m ² respectively. Compute the rate of flow of water.	07
Q.4	(a) Discuss stability of submerged and floating bodies with neat sketches	03
	(b) Explain the different hydraulic & mouth piece.	04
	(c) Derive the expression for discharge over the (1) Rectangular notch and (2) Triangular notch	07
OR		
Q.4	(a) Explain the phenomenon of water hammer	03
	(b) What is pitot-tube? How the velocity at any point is determined with the help of pitot-tube.	04
	(c) What is venturimeter. Derive an expression for the discharge Through a venturimeter.	07
Q.5	(a) Define continuity equation & derive it.	03
	(b) What are repeating variables? How are they selected for dimensional analysis?	04
	(c) Derive an expression for the loss of head due to friction in pipes.	07
OR		
Q.5	(a) Explain viscous flow.	03
	(b) Explain the terms. specific energy, critical depth, critical velocity, alternate depth	04
	(c) State Buckingham's π theorem. Why it is considered superior over Rayleigh method for dimension analysis.	07
