

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2021****Subject Code:3153515****Date:07/09/2021****Subject Name:Elements of Fluid Mechanics****Time:10:30 AM TO 01:00 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) Differentiate between laminar and turbulent flow?	03
	(b) Mention any four properties of fluids with corresponding units.	04
	(c) What is boundary layer? Discuss the formation of boundary layer for flow of fluid in a pipe	07
Q.2	(a) Mention the characteristic features of potential flow.	03
	(b) Water is flowing through a pipe of 50 mm ID at rate of 100 kg/min. Calculate Reynolds number and type of flow.	04
	(c) Classify fluids based on Newton's law of viscosity and stress strain relationships.	07
OR		
	(c) The pressure intensity at a point in a fluid is 3.294 N/cm^2 . Find the corresponding height of fluid when the fluid is (a) water (b) oil of specific gravity 0.9	07
Q.3	(a) How hydraulic diameter can be used for estimation of flow in non-circular cross sections?	03
	(b) Differentiate skin friction and form friction.	04
	(c) A simple U tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.8 and is subjected to a vacuum pressure is flowing. The other end of manometer is open to atmosphere. Find the vacuum pressure in a pipe, if the difference of mercury level in two limbs is 40 cm and height of manometric fluid in left limb is 15 cm below centre of pipe.	07
OR		
Q.3	(a) Brief the various hydraulic coefficients of orifice.	03
	(b) A pipe through which water is flowing is having 20cm and 10 cm at the cross sections 1 and 2 respectively. The velocity of water at section 1 is 4 m/s. Find the velocity at sections 1 and 2 and also rate of discharge.	04
	(c) Listing various assumptions write the various representational forms of Bernoulli's equation.	07
Q.4	(a) Mention the relationship between Drag and streamlining?	03
	(b) Explain with a figure any four heads in a pump.	04
	(c) Derive Hagen Poiseuille's equation for estimating flow of a fluid through a pipe.	07
OR		
Q.4	(a) Mention Stoke's law. How the motion of a spherical particle is explained in fluid medium by Stoke's law?	03
	(b) What is meant by Cavitation? How cavitation is related to property of vapor pressure?	04

- (c) For the flow of a fluid through an orifice meter prove that $C_d = C_c C_v$ **07**
- Q.5** (a) Differentiate between free settling and hindered settling. **03**
- (b) Brief the various methods adopted for prevention of swirling in agitated vessels. **04**
- (c) What is fluidization? Derive an expression to calculate the pressure drop for flow of a fluid through a packed bed. **07**
- OR**
- Q.5** (a) Write a short note on power consumption in agitated vessels. **03**
- (b) Explain the significance of minimum fluidization velocity. **04**
- (c) Discuss the various types of impellers used in Industries. **07**
