

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2022****Subject Code:3153515****Date:04-01-2023****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) Determine the mass density, specific volume and specific weight of a liquid whose specific gravity is 0.85.	03
(b) Explain the fluid property of vapor pressure?	04
(c) Detail the classification of fluids based on Newton's law of viscosity with suitable diagrams.	07
Q.2 (a) Convert pressure head of mercury into equivalent pressure head of water.	03
(b) Write a short note on various pressure measurement scales.	04
(c) An oil tank contains water up to a depth of 4m and above it oil of specific gravity 0.9 for a depth of 1.5 m. Find the intensity of pressure at <ol style="list-style-type: none"> i. Interface of two liquids ii. At the bottom of tank 	07
OR	
(c) Discuss the case of boundary layer formation for flow of fluid over a flat plate.	07
Q.3 (a) Detail the various hydraulic coefficients of orifice.	03
(b) With a neat diagram explain the working of Rotameter.	04
(c) Write the three representational forms of Bernoulli's equation for flow of an incompressible fluid. Also state necessary assumptions	07
OR	
Q.3 (a) Mention the differences between Positive displacement and Centrifugal pumps.	03
(b) A 25 cm diameter pipe carries oil of specific gravity 0.9 at a velocity of 3 m/s. At another section the diameter is 20 cm. Find the velocity at this section and mass flow rate of oil.	04
(c) For laminar incompressible flow of fluid through a pipe, prove that ratio of average velocity to maximum velocity is 0.5.	07
Q.4 (a) Explain the term Vena contracta with respect to flow of fluid through an orificemeter.	03
(b) Explain the working of Centrifugal pump describing its important parts of a Centrifugal pump	04
(c) Discuss the case of different forms of form frictional losses for the flow of fluid through a pipe.	07
OR	
Q.4 (a) Explain Cavitation with help of fluid property vapor pressure.	03
(b) Water flows through a pipe of diameter 6cm and 900m long at the rate of 0.6 kg/sec. Determine the head lost due to friction	04

- (c) Derive Kozeny Carman equation for estimating pressure drop for flow of fluid through a packed bed **07**
- Q.5** (a) Differentiate agitation and mixing? **03**
- (b) A pulse of sediment laden runoff is delivered to a pond. How long will it take for clay particles of size 0.05mm to settle through a depth of 1m assuming stokes law to be applicable? Take viscosity of water as 1 cp and density of clay particles as 2650 kg/m³. **04**
- (c) Write a short note on flow pattern in agitated vessels with the ways adopted for prevention of swirling? **07**
- OR**
- Q.5** (a) Explain the function of draft tubes and baffles in agitation operations. **03**
- (b) Write a short note on various types of impeller used in process industries. **04**
- (c) What is Fluidization? Mention various types of fluidization stating relevant applications? **07**
