Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020

Subject Code:3153515 Date:22/01/2021

Subject Name:Elements of Fluid Mechanics

Time:10:30 AM TO 12:30 PM Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	(i)What is the basic difference between Mixing and Agitation? (ii)Define: Kinematic viscosity (iii)What is Co-efficient of drag?	**03**
	(b)	Differentiate Between Centrifugal pump and positive displacement pump.	**04**
	(c)	Explain Fluidization operation with suitable diagram of pressure drop and bed height versus superficial velocity for a bed of solid.	**07**
Q.2	**(a)**	What is cavitation in pump and how it can be prevented?	**03**
	(b)	List out Properties of the fluid and explain any two in detail.	**04**
	(c)	Write the three representational forms of Bernoulli's equation relating to flow of fluid between two points in an incompressible fluid.	**07**
Q.3	**(a)**	Give a brief note on Commercial Applications of fluidized bed	**03**
	(b)	What is vortex formation and how it can be prevented?	**04**
	(c)	Derive Hagen Poiseull's equation for the flow of incompressible fluid in laminar regime through a pipe.	**07**
Q.4	**(a)**	Define: (i)Drag (ii)Power No. (iii) Hydraulically smooth pipe	**03**
	(b)	Explain about flow pattern generated during mixing?	**04**
	(c)	The oil is flowing through a pipe of 80 mm in diameter under a gauge pressure of 100 kPa, and with a mean velocity of 2.5 m/s. The specific gravity of oil is 0.85. Neglecting friction, find the total head, if pipe is above the datum line.	**07**
Q.5	**(a)**	Discuss difference between skin friction and form friction.	**03**
	(b)	Mention newton's law of viscosity. Give the classification of fluids Based on Newton's law of viscosity.	**04**
	(c)	A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure flow of oil of specific gravity 0.8. The discharge of oil through venturimeter is 60 liters/sec. Find the reading of oil – mercury differential manometer C_d = 0.98.	**07**
Q.6	**(a)**	Explain how boundary layer separation takes place?	**03**
	(b)	Explain vapor pressure and its variation with temperature.	**04**

	(c)	An orifice meter consisting of 100 mm in diameter orifice in a 250 mm diameter pipe has Cd= 0.65. The pipe delivers oil of specific gravity of 0.8. The pressure difference on the two side of the orifice plate is measured by a mercury oil differential manometer. If the differential gauge reading is 800 mm of mercury, find the rate of flow in liter/s.	**07**
Q.7	**(a)**	What are the types of fluidization?	**03**
	(b)	Write a short note on different correction factors applied in Bernoulli's equation for fluid flow in a practical situation.	**04**
	(c)	Explain Characteristic curves of the centrifugal pump	**07**
Q.8	**(a)**	What is transition length? Mention its relation with Reynolds's number for flow through a pipe.	**03**
	(b)	A circular disc of 2 m in diameter is held normal to a 30 m/s wind of density 1.2 kg/m3. What is the drag force exerted by wind on this disc? Assume co-efficient of drag for the disc is 1.2.	**04**
	(c)	With a neat and clean diagram explain the working principle of rotameter.	**07**

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