Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2130502 **Date: 11/06/2019**

Subject Name:Fluid Flow Operation

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.**

			MARKS
Q.1	**(a)**	Define compressible & incompressible flow.	**03**
	(b)	Distinguish between blower and compressor.	**04**
	(c)	An oil of specific gravity 0.7 is flowing through a pipe of diameter 300 mm at the rate of 500 lit./sec. find the head loss due to friction and power requirement to maintain the flow for a length of 1000 meter. Kinematic viscosity of oil is 0.29 stock.	**07**
Q.2	**(a)**	Write the application of Mach number.	**03**
	(b)	Define cavitation. How we can avoid cavitation.	**04**
	(c)	Carbon tetrachloride is to flow through a smooth horizontal circular tube of ID 3 cm at a volumetric flow rate of 2 liter per second at 25 ^{0}C. Calculate the pressure loss per cm. length of tube. Density & viscosity of Carbon tetrachloride are 1.54 gm/cc. and 0.87c.p. respectively.	**07**
		OR	
	(c)	Calculate the power required and pressure which should be developed by a pump of 70% efficiency in order to send 60 kg/min of 98%, sulphuric acid at 25 ^{0}C from a tank at atmospheric pressure through 300 meters of 5 cm ID, steel pipe to a tank of 2 kg/cm^2 pressure, where the level is 3 meters above that in the lower tank. Density & viscosity of the acid may be taken as 1.8 gm/cc., and 26c.p. respectively.	**07**
Q.3	**(a)**	Define hydraulic radius.	**03**
	(b)	Give the application of gate valve & globe valve.	**04**
	(c)	Give the statement Bernoulli's theorem. Write the assumptions and derive Bernoulli's equation.	**07**

OR

Q.3	**(a)**	Write the physical significance of Reynolds number.	**03**
	(b)	Define air binding & priming.	**04**
	(c)	Give the classification of pump. And discuss in detail.	**07**
Q.4	**(a)**	What is skin friction and form friction?	**03**
	(b)	Define viscosity. How it varies with temperature & pressure.	**04**
	(c)	Compare Newtonian & Non-Newtonian. And discuss in details.	**07**

OR

Q.4	**(a)**	Define Schedule number & BWG.	**03**
	(b)	Give the application of gravity decanter & centrifugal decanter.	**04**
	(c)	What is fluidization? Discuss the types of fluidization with its principles	**07**
Q.5	**(a)**	Define fully developed flow.	**03**
	(b)	Distinguish between venture meter & orifice meter.	**04**
	(c)	For laminar flow of fluid through pipe, derive the following relation for the ratio of local velocity to maximum velocity, $\frac{u}{u_{max}} = 1\text{-} \left(\frac{r}{r_w}\right)^2$	**07**

OR

Q.5	**(a)**	Define friction.	**03**
	(b)	Define free settling and hindered settling of particle.	**04**
	(c)	Derive Hagen – Poiseuille's equation with its significance.	**07**

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