Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Winter Examination-2019

Subject Name : Fluid Mechanics

Subject Code : 4TE04FME1 **Branch: B.Tech (Mechanical)**

Semester: 4 **Date: 13/09/2019** **Time: 02:30 To 05:30** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) Define: Specific Weight and Specific Volume.
b) Define: Surface tension and Capillarity.
c) State the Pascal's law.
d) State the limitation of simple manometer.
e) Differentiate between real and ideal fluid.
f) Differentiate between one dimensional and two dimensional fluid flows.
g) State the control volume and system.
h) Write notable application of Navier- Stroke's equation.
i) Write application of dimensional analysis.
j) Differentiate between the fundamental and derived dimensions.
k) Define Reynold's number.
l) State various methods used for measuring of viscosity.
m) Define Compressible flow in terms of mach number.
n) State any four characteristics of turbulent flow.

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

(A) State the Newton's law of viscosity and give examples of its application. **(07)**

(B) A plate, 0.04 mm distance from a fixed plate, moves at 70 cm/s and requires a force of 3.5 N/m^2 to maintain this speed. Calculate the fluid viscosity between the plates. **(07)**

Q-3 **Attempt all questions** **(14)**

(A) Derive an equation of pressure variation with respect to vertical axis in a fluid under the gravity. **(07)**

(B) A horizontal venturimeter with inlet diameter 140 mm and throat diameter 70 mm is install to measure the discharge of water. The differentiate manometer connected the inlet gives reading of 130 mm of mercury. Find the discharge if co-efficient of discharge is 0.96. **(07)**

Q-4		**Attempt all questions**	**(14)**
	(A)	State the methods of dimensional analysis and describe any one method for dimensional analysis.	**(07)**
	(B)	Explain dash-pot mechanism with neat sketch.	**(07)**
Q-5		**Attempt all questions**	**(14)**
	(A)	Derive the Hagen-Poiseullie equation stating the assumption made. Sketch velocity and shear distribution in pipe flow.	**(07)**
	(B)	Derive Froude's model law for (a) Velocity (b) Time.	**(07)**
Q-6		**Attempt all questions**	**(14)**
	(A)	Explain Mach cone and Mach angle with help of sketch.	**(07)**
	(B)	Write a note on use of Moody diagram for calculating the head loss due to friction.	**(07)**
Q-7		**Attempt all questions**	**(14)**
	(A)	Explain fully turbulent flow.	**(07)**
	(B)	Explain velocity of sound for isothermal and adiabatic process.	**(07)**
Q-8		**Attempt all questions**	**(14)**
	(A)	Derive an expression for discharge through a venturimeter and compare it with orifice meter for measuring of flow through pipes.	**(07)**
	(B)	Explain stable, unstable and neutral equilibrium with reference to floating body.	**(07)**