Enrollment No: _____   Exam Seat No:_____

C.U.SHAH UNIVERSITY
Summer Examination-2019

Subject Name: Fluid Mechanics
Subject Code: 4TE04FME1   **Branch: B.Tech (Mechanical)**
Semester: 4   Date: 18/04/2019   **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) What is the correct formula for absolute pressure?   01
A) $P_{abs} = P_{atm} - P_{gauge}$ B) $P_{abs} = P_{vacuum} - P_{atm}$ C) $P_{abs} = P_{vacuum} + P_{atm}$ D) $P_{abs} = P_{atm} + P_{gauge}$

b) Unit of viscosity in CGS system is   01
A) pascal   B) Poise   C) Stoke   D) bar

c) According to Archimede's principle, if a body is immersed partially or fully in a fluid then   01
the buoyancy force is _____ the weight of fluid displaced by the body
A) equal to   B) less than   C) more than   D)unpredictable

d) Viscous forces are not present in   01
A) rotational flow   B) irrotational flow   C) laminar flow   D) none of the above

e) Continuity equation is   01
A) Q=AV   B) $Q=AV^2$ C) $Q=A^2V^2$ D) None

f) When flow rate is constant then the type of flow is……..   01
A) Steady flow   B) Uniform flow   C) Compressible flow   D) None

g) Reynold's number is defined as ratio of ___   01
A) inertia force to viscous force   B) viscous force to inertia force   C) both A and B   D) None of the above

h) If Reynold's number is less than 2000, then the flow is   01
A) Turbulent   B) Laminar   C) transit   D) None of the above

i) The flow in which the velocity is function of time and one space co-ordinate is called as __   01
A) one dimensional   B) two dimensional   C)) three dimensional   D) None of the above

j) Density = _____   01
A) Mass / volume   B) Volume/ weight   C) volume / mass   D) None of the above

k) In stable equilibrium, metacentre is lies _____ centre of gravity.   01
A) Above   B) Below   C) Equal   D) None of the above

l) The device used for the measuring the pressure at a point in a fluid by balancing the   01

column of fluid by another column of fluid is known as _____
A) manometer   B) piezometer   C) U-tube manometer   D) All of the above

m) When centre of buoyancy is lies above the centre of gravity then submerged is ____   01
A) Neutral equilibrium   B) stable equilibrium   C) unstable equilibrium   D) None of the above

n) A study of fluid in rest is known as   01
A) Fluid statics   B) Fluid dynamics   C) Fluid kinematics   D) None

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

Q-2		**Attempt all questions**	**(14)**
	(a)	Explain capillary rise and capillary fall. Derive expression for capillary rise.	**07**
	(b)	Explain briefly U – tube manometer.	**07**
Q-3		**Attempt all questions**	**(14)**
	(a)	With neat sketches, explain the conditions of equilibrium for floating and sub – merged bodies.	**07**
	(b)	Define the equation of continuity. Obtain the expression for continuity equation for a three dimensional flow.	**07**
Q-4		**Attempt all questions**	**(14)**
	(a)	Differentiate between: 1. Laminar flow and turbulent flow 2. Compressible flow and incompressible flow.	**07**
	(b)	What is venturimeter? Derive an expression for the discharge through venturimeter.	**07**
Q-5		**Attempt all questions**	**(14)**
	(a)	Define the term Notch and also derive an expression for the discharge over a rectangular Notch.	**07**
	(b)	The diameter of a pipe at the sections 1 and 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5 m/s. Determine also the velocity at section 2.	**07**
Q-6		**Attempt all questions**	**(14)**
	(a)	Give the dimensions of : (i) Force (ii) viscosity and (iii) power.	**03**
	(b)	What are the types of dimensional analysis? Describe the Rayleigh's method for dimensional analysis.	**04**
	(c)	Derive Darcy – Weichback equation.	**07**
Q-7		**Attempt all questions**	**(14)**
	(a)	What are the methods of measurement of viscosity? Explain Capillary tube method	**07**
	(b)	Define and explain the terms: 1. Mach number 2. Mach angle.	**07**
Q-8		**Attempt all questions**	**(14)**
	(a)	Explain the following: 1. Newtonian and Non – Newtonian fluid 2. Vapour pressure.	**07**
	(b)	What is Hagen Poiseuille's formula? Derive an expression for it.	**07**