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# C. U. SHAH UNIVERSITY Summer Examination-2022 

## Subject Name : Fluid Mechanics -I

Subject Code : 4TE03FLM1

Branch: B.Tech (Civil)
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:

a) Define Specific mass,
b) State Pascal's Law and Archimedes' Principle.
c) Define the term 'buoyancy ' and 'center of buoyancy'
d) Write down the devices used to measure (i) pressure (ii) velocity and (iii) discharge in a pipe carrying flow of water.
e) Define Weight density,
f) What do you understand by 'Total Pressure' and 'Centre of Pressure'?
g) Define the term 'meta-centre ' and 'meta-centric height'
h) What is an equivalent pipe?
i) Define Surface tension,
j) What is syphon? Where is it's used?
k) Define Impact of jets.
l) Define Jet propulsion.
m) Define Stream function
n) Define mouth piece and orifice.

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

## Q-2 Attempt all questions

(a) Explain the terms Dynamic Viscosity and Kinematics Viscosity. Also discuss the effect of temperature on viscosity.
(b) Explain with sketch the relationship between the absolute pressure, atmospheric pressure and gauge pressure.

## Q-3 Attempt all questions

(a) A plate 0.025 mm distant from a fixed plate, move at $60 \mathrm{~cm} / \mathrm{s}$ and requires a force of 2 N per unit area i.e. $2 \mathrm{~N} / \mathrm{m} 2$ to maintain this speed. Determine the fluid viscosity between the plates.
(b) Explain how you will determine the meta-centre height of a floating body
experimentally? Explain with neat sketch.
Q-4 Attempt all questions(14)
(a) Explain analytical Method to determine Metacentric height.
(b) Derive an expression for the force exerted on a sub-merged vertical plan surface by the static liquids and locate the position of center of pressure.
Q-5 Attempt all questions
(a) State the Bernoulli's equation and obtain Bernoulli's equation from Euler's equation of motion.
(b) Derive continuity equation for 2-D incompressible flow in Cartesian form stating the assumption made and principle involved.
Q-6 Attempt all questions
(a) Give classification of notches and weirs. Derive equation for the flow over a triangular notch.
(b) What is Venturimeter? Derive an expression for the discharge through a Venturimeter.
Q-7 Attempt all questions
(a) Describe various types of fluid flows with examples of each.
(b) Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
Q-8 Attempt all questions
a) Explain jet impingement upon a stationary flat plate.
b) Explain the jet impingement upon a moving flat plate.

