Roll No: | | | | | | | | | | | | | |

BTECH
(SEM III) THEORY EXAMINATION 2021-22
FLUID MECHANICS

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a.	Define Buoyancy.
b.	What are manometers?
c.	Define steady and unsteady flow with examples.
d.	State continuity equation.
e.	Explain pitot tube with example.
f.	Explain laminar flow with two examples.
g.	What is magnus effect.

SECTION B

2. Attempt any *three* of the following: 3 x 7 = 21

a.	Prove that the pressure in a fluid at rest is same in all directions.
b.	Explain different types of fluid flow in brief.
c.	Illustrate orifice meter in detail with the help of diagrams.
d.	Write the characteristics of turbulent flow.
e.	Explain kinematic and dynamic similarity.

SECTION C

3. Attempt any *one* part of the following: 1 x 7 = 7

(a)	The pressure intensity at a point in a fluid is given 3.924 N/cm^2. Find the corresponding height of the fluid when the fluid is (a) water (b) Oil of specific gravity 0.9
(b)	Examine the different devices used for measuring pressure in a fluid.

4. Attempt any *one* part of the following: 1 x 7 = 7

(a)	Describe streamline, path lines, streak lines and stream tube with diagrams.
(b)	Estimate the velocity and acceleration at a point (1,2,3) after 1 second for a 3D flow field given by u = yz + t, v = xz – t, w = xy m/s.

5. Attempt any *one* part of the following: 1 x 7 = 7

(a)	State Bernoulli's theorem and derive its expression.
(b)	A 30 cm diameter horizontal pipe terminates in a nozzle with the exit diameter of 7.5 cm if the water flows through the pipe at a rate of 0.15 m^3/sec. Estimate the force that will be exerted by the fluid on the nozzle?

6. Attempt any *one* part of the following: 1 x 7 = 7

(a)	Explain laminar boundary layer and turbulent boundary layer with diagrams.
(b)	A crude oil of dynamic viscosity 0.97 poise & relative density 0.9 is flowing through a horizontal circular pipe of diameter 100 mm and length 10m. Calculate difference of pressure at two ends of pipe if 100 kg of oil is collected in a tank in 30 seconds.

7. Attempt any *one* part of the following: 1 x 7 = 7

(a)	State Buckingham's π theorem with the help of example.
(b)	Illustrate all the dimensionless numbers with applications.