Enrollment No._____

NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Engineering and Technology
Program/s: Civil Engineering
Year: 2nd **Semester:** 4th
Examination: End Semester Examination
Examination year: February-March 2023

Course Code: CE 217 **Course Name:** **Fluid Mechanics II**
Date: 15/05/2023 **Total Marks:** 40
Time: 10:00 am to 12.00 pm **Total Pages:** 1

Instructions:

- *Write each answer on a new page.*
- *Use of a calculator is permitted.*

Q. No.	Details	Marks	COs*	BTL#
Q.1	Derive an equation for measuring depth of hydraulic jump?	5	CO4	BT1, BT2
Q.2	Derive the conditions for a section for most economical in trapezoidal shape.	5	CO3, CO2	BT1, BT2
Q.3	The difference of water surface levels in two tanks, which are connected by two pipes in series of lengths 300 m and 350 m and diameters 250mm and 300mm respectively, is 10 m. Determine the rate of flow of water if co-efficient of friction are 0.0052 and 0.0047 respectively. Consider all minor losses.	5	CO2	BT2, BT4
	OR			
Q.3	Show graphical representation of specific energy curve and derive the equation for critical depth and critical velocity.	5	CO3	BT2, BT1
Q.4	Derive an equation for the propeller thrust P which depends on the angular velocity w, speed V, diameter D, dynamic viscosity μ, mass density ρ, elasticity of the fluid medium which can be denoted by the speed of sound in the medium C. Solve it by Buckingham's π theorem	5	CO3 CO4	BT3 BT4
	OR			
Q.4	The frictional torque T of a disc of diameter D rotating at a speed N in a fluid of viscosity μ and density ρ in a turbulent flow. Solve it by Buckingham's π theorem.	5	CO3 CO4	BT3 BT4
Q.5	The resisting force R of a supersonic plane during flight can be considered as dependent upon the length of the air craft L, velocity V, air viscosity μ, air	5	CO3 CO4	BT3 BT4

density ρ and bulk modules K. Express the functional relationship between these variables by Relying's method.

Q.6	Define the following terms: 1. Length of Hydraulic jump 2. Alternate depth 3. Rapidly varied flow 4. Super-critical flow 5. Steady non uniform flow	5	CO3 CO4	BT2, BT1
Q.7	A rectangular channel carries water at a rate of 490 Liters/sec when bed slope is 1 in 2800. Find the most economical dimensions of channel if C = 55	5	CO4	BT3 BT4
Q.8	Find the discharge through a rectangular channel 4.5m wide, having a depth of water 3.2m and bed slope 1 in 2000. Take the value of N = 0.03 in kutter's formula.	5	CO4	BT3 BT4