University of Mumbai

Examination First Half 2022 under cluster __ (Lead College: _____)

Examinations Commencing from 17th May 2022 to 17th June 2022

Program: Civil Engineering

Curriculum Scheme: Rev2019

Examination: SE Semester IV

Course Code and Course Name: Fluid Mechanics-II

Time: 2 hour 30 minutes Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The value of bulk modulus of a fluid is required to determine
Option A:	Reynold's number
Option B:	Froude's number
Option C:	Mach number
Option D:	Euler's number
2.	For a laminar flow through pipe, the shear stress over the cross section
Option A:	Varies inversely as the distance from the center of pipe
Option B:	Varies directly as the distance from the surface of the pipe
Option C:	Varies directly as the distance from the center of the pipe
Option D:	Remains constant over the cross section
3.	A flow in which _____ force is dominating over the viscosity is called turbulent flow
Option A:	Elastic
Option B:	Surface Tension
Option C:	Viscous
Option D:	Inertia
4.	When the fluid is called laminar?
Option A:	Low viscosity
Option B:	The density of the fluid is high
Option C:	Reynolds number is greater than 2000
Option D:	Reynolds number is less than 2000
5.	Power transmitted by the nozzle will be maximum when head lost due to friction is equal to _____ of total head at inlet of the pipe.
Option A:	One-fifth
Option B:	Half
Option C:	One-third
Option D:	One-fourth
6.	In Total Head or Energy formula what does “Z” stands for TE = p/w + Z + v2/2g
Option A:	Datum Head
Option B:	Velocity Head
Option C:	Pressure Head
Option D:	Total Head

7.	Force can be written as_____
Option A:	$[M][L][T]^{-2}$
Option B:	$[M][L][T]^{2}$
Option C:	[M][L][T]
Option D:	$[M][L][T]^{3}$
8.	Boundary layer thickness is the distance from the surface of the solid body in the direction perpendicular to flow, where the velocity of fluid is equal to
Option A:	Free stream velocity
Option B:	0.9 times the free stream velocity
Option C:	0.99 times the free stream velocity
Option D:	0.5 times the free stream velocity
9.	For gradual closure of valve, time of closure
Option A:	T > (2L/C)
Option B:	T < (2L/C)
Option C:	T > (L/2C)
Option D:	T < (L/2C)
10.	Which property of the fluid accounts for the major losses in pipes?
Option A:	Density
Option B:	Specific Gravity
Option C:	Compressibility
Option D:	Viscosity

Q2.	**Solve any Four out of Six** **5 marks each**
A	Explain Prandlt's mixing length theory.
B	Explain different steps in solving distribution network by Hardy Cross method
C	Define Mach number and state its significance in compressible fluid flow
D	Explain Hydraulic Gradient Line and Total Energy Line
E	Explain Hydro dynamically smooth and rough boundaries
F	Explain Water hammer with its control measures

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Explain & derive the expression for Momentum Thickness & Energy Thickness
B	Three pipes joined in series release water from 75-meter level to 35-meter level. The details of piping system are given in the table

Pipe	Length	Diameter (mm)	Friction factor
1	1200	150	0.015
2	800	75	0.025

	3 | 1100 | 100 | 0.020 Considering minor and major losses in pipes determine discharge, velocity and head loss in each pipe
C	Two reservoirs are connected by a pipeline consisting of two pipes, one of 15 cm diameter and length 6m and the other of diameter 22.5 cm and 16 m length. If the difference of water level in the two reservoirs is 6m, calculate the discharge and draw the HGL & TEL. Take f= 0.04.

Q.4	**Solve any Two Questions out of Three** **10 marks each**
A	For a laminar flow through circular pipe, prove that the ratio of maximum velocity to the average velocity is equal to 2.
B	Derive an expression for velocity distribution of turbulent flow in smooth and rough pipe
C	Calculate the discharge in each pipe of the network shown in figure below by Hardy-Cross method. Take n = 2.0