University of Mumbai

Program: Civil Engineering
Curriculum Scheme: Rev2019
Examination: SE Semester- III
Course Code: CEC305and Course Name: Fluid mechanic I
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.	Density of water Kg/m³
Option A:	1500
Option B:	1000
Option C:	2000
Option D:	3000
2.	1 poise NS/m²
Option A:	1/10
Option B:	1/100
Option C:	1/1000
Option D:	1/10000
3.	A real fluid, in which the shear stress is directly proportional to the rate of shear strain or velocity gradient is known as _____ fluid
Option A:	Ideal plastic
Option B:	Non-Newtonian
Option C:	Newtonian
Option D:	Compressible
4.	A real fluid, in which the shear stress is not directly proportional to the rate of shear strain or velocity gradient is known as _____ fluid
Option A:	Ideal plastic
Option B:	Non-Newtonian
Option C:	Newtonian
Option D:	Compressible
5.	Density of water_____g/cm³
Option A:	1
Option B:	2
Option C:	3
Option D:	4
6.	When force of buoyancy (point B) is above center of gravity (G) the body is said to be _____equilibrium.
Option A:	Stable
Option B:	Unstable
Option C:	Neutral

Option D:	Both Stable and unstable.
7.	When a body is immersed in a fluid an upward force is exerted by the fluid on the body. The magnitude of upward force can be determined by _____ principles.
Option A:	Pascal
Option B:	Archimedes
Option C:	Continuity
Option D:	Momentum
8.	When force of buoyancy (point B) is below center of gravity (G) the body is said to be _____ equilibrium.
Option A:	Stable
Option B:	Unstable
Option C:	Neutral
Option D:	Both Stable and unstable.
9.	If flow in which the fluid characteristics like velocity, pressure, density etc. at a point do not change with time then that type of flow is called
Option A:	Steady
Option B:	Unsteady
Option C:	Compressible
Option D:	Incompressible
10.	If the Reynolds number is less than 2000 the flow is called
Option A:	Laminar
Option B:	Turbulent
Option C:	Both A & B
Option D:	Neither A Nor B

Q2	**Solve any four out of six 5 marks each**
I	Write short note on types of Fluids?
II	Derive Bernoulli's equation of motion from Euler equation.
III	What is condition of equilibrium (stability) of a floating body and submerged body?
IV	What are different types of fluid flows?
V	Write a short note on Propagation of pressure wave.
VI	Derive an expression for velocity of sound in terms of bulk modulus.

Q3	**Solve any four out of six 5 marks each**
I	Water is flowing through a pipe having Diameter 290mm and 180mm at bottom and upper end, respectively. The intensity of pressure at the

	bottom end is 22.525N/cm^2 and the pressure at the upper end is 10.81N/cm^2. Determine the difference in datum head if the rate of flow through pipe is 50lit/sec.
II	Find the Mach number when an aero plane is flying at 1300 Km/hour through still air having a pressure of 10 N/CM^2 and temperature -15°C. Take R= 287.14 J/Kg. Calculate the pressure, temperature, and density of air at stagnation point on the nose of the plane. Take K=1.4
III	Derive an expression for velocity of sound wave in a fluid.
IV	Derive Pascal's Law
V	Two large plane surfaces are 2.4 cm apart. The space between the surfaces is filled with glycerine. What force is required to drag a very thin plate of surface area 0.5 square meter between the two large plane surfaces at a speed of 0.6 m/s, if: (I) the thin plate is in the middle of the two plane surfaces, and (ii) the thin plate is at a distance of 0.8 cm from one of the plane surfaces? Take the dynamic viscosity of glycerine = 8.10 x 10^{1} N s/m^2.
VI	Explain in detail Surface tension and capillarity

Q4	**Solve any four out of six 5 marks each**
I	Define Orifice and Classification of orifice
II	Explain in detail Experimental Determination of Hydraulic Coefficient.
III	A rectangular orifice 1.5 m wide and 1 m deep is discharging water from tank. If the water level in the tank is 3m above the top edge of the orifice, find the discharge through the orifice. Take the coefficient of discharging through the orifice. Take Cd= 0.6
IV	Difference between Notch And Weir.
V	Derive an expression for discharge over rectangular notch or weir.
VI	A circular tank of diameter 1.25 m contains water up to a height 5m. An orifice of 50mm diameter is provided at its bottom. If Cd=0.62, find the height of water above the orifice after 1.5 minutes.