JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Supplementary Examination- 2026

B.Tech-III Semester (CE)

COURSE CODE(CREDITS): 25B11CE313 (3)   MAX. MARKS: 75
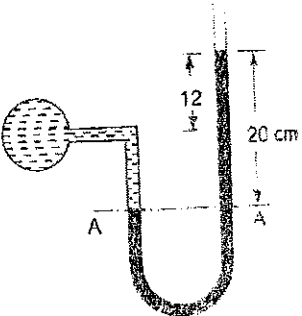
COURSE NAME: Fluid Mechanics

COURSE INSTRUCTORS: Ashish Kumar   MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

   (b) The candidate is allowed to make Suitable numeric assumptions wherever required for

   solving problems

   (c) Use of scientific calculator is allowed.

Q.No	Question	CO	Marks
Q1 (a)	For what purpose manometers are used? Differentiate between simple manometer and differential manometer with suitable example	2	5
Q1 (b)	The right limb of a simple U tube manometer contains the mercury and is open to atmosphere. The left limb is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The centre of the pipe is 12 cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe if difference of mercury level in two limbs is 20 cm.	2	7
Q2 (a)	Define Newton's Law of Viscosity. Explain different types of fluids on the basis of shear stress and velocity gradient.	1	5
Q2 (b)	An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.8 m x 0.8 m and inclined plane having an angle of inclination 20°. The weight of square plate is 300 N and it slides down the plane with a uniform velocity of 0.3 m/sec. Find the Dynamic viscosity of the oil.	1	8
Q3	Explain the term meta-centre and metacentric height of a floating body. How the position of meta-centre affects the stability of floating bodies. explain with neat diagram	6	5

Q4 (a)	Explain the working principle of an Orifice meter? Write down the significance of providing orifice meter in the pipe. Why coefficient of discharge is less for Orifice meter in comparison of venturimeter?	4	5
Q4 (b)	An orifice meter with orifice diameter 15 cm is inserted in a pipe of 30 cm diameter. The pressure difference measured by a mercury manometer fitted on the two sides of the orifice meter gives a reading of 50 cm of mercury. Find the rate of flow of oil of specific gravity 0.9 when the co-efficient of discharge of the meter = 0.64	4	10
Q5	A 40 cm dia meter pipe, conveying water, branches into two pipes of diameter 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe in 3 m/sec. Find the discharge in this pipe. Also determine the velocity in 20 cm pipe if the average velocity in 30 cm dia pipe is 2 m/sec.	3	8
Q6	Determine the rate of flow of water through a pipe of diameter 20 cm and length 50 m when one end of pipe is connected with tank and other end is open to atm. The pipe is horizontal and height of water in the tank is 4 m above the centre of the pipe. Take $f = 0.009$.	4	10
Q7	A partially submerged body is towed in water. The resistance R to its motion depends on the density ρ, dynamic viscosity of the water, length L of the body, velocity v of the body and the acceleration due to gravity g. show that the resistance to the motion can be expressed in the form of $$R = \rho L^2 V^2 \phi\left[\left(\frac{\mu}{\rho VL}\right),\left(\frac{Lg}{V^2}\right)\right]$$	5	12