QP Code: S253A039 Reg. No | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Third Semester – Regular & Supplementary) Examinations, November 2025

23BCHPC23002 - Fluid Mechanics

(Chemical Engineering)

Time: 3 hrs Maximum: 60 Marks

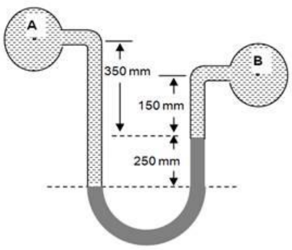
Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions		CO #	Blooms Level
a.	Differentiate between compressible and incompressible fluids.	CO1	K1
b.	What are the assumptions made in deriving Bernoulli's equation?	CO2	K2
c.	Define drag and lift force.	CO3	K3
d.	What is negative slip and when does it occur?	CO4	K2
e.	Define Priming in pump and why it is necessary?	CO5	K3

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Explain Pascal's Law and derive the expression for pressure at any point in a static fluid.	6	CO1	K2
b.	A tank contains two immiscible fluids of densities 900 kg/m^3 and 1200 kg/m^3. The height of lighter fluid is 2 m, and the heavier one is 3 m. Find the total pressure at the bottom of the tank.	4	CO1	K3
	(OR)			
c.	A vertical cylinder of diameter 180mm rotates concentrically inside another cylinder of diameter 181.2mm. Both the cylinders are 300mm high. The space between the cylinders is filled with a liquid. Determine the viscosity of the liquid if a torque of 20Nm is required to rotate the inner cylinder at 120rpm.	10	CO1	K1
3.a.	A U-tube differential manometer is connected to two pipes at A and B. Pipe A Contains oil of Specific Gravity 0.94 and pipe B is carrying water. If the pressure at point A is 125 kN/m^2 find the pressure at point B. 	10	CO2	K1
	(OR)			
c.	Discuss boundary layer formation in a straight tube with neat diagram.	6	CO3	K2
d.	Differentiate between simple and differential manometers.	4	CO2	K2
4.a.	A 40cm diameter pipe conveying water branches into two pipes of diameters 30cm and 20cm, respectively. If the average velocity in the 40cm diameter pipe is 3m/s, find the discharge in this pipe. Also determine the velocity in 20cm pipe if the average velocity in 30cm diameter pipe is 2m/s.	10	CO3	K3
	(OR)			
b.	An oil of specific gravity 0.9 is flowing through a venturimeter having inlet	10	CO3	K3

	diameter 20cm and throat diameter 10cm. The oil-mercury differential manometer shows a reading of 20cm. Calculate the discharge of oil through the horizontal venturimeter. Take $C_d = 0.98$.			
5.a.	The resistance force R of a supersonic plane during flight can be considered as dependent upon the length of the aircraft l, velocity V, air viscosity μ, air density ρ and bulk modulus of air K. Express the functional relationship between these variables and resisting force.	10	CO4	K2
	(OR)			
b.	The pressure difference p in a pipe of diameter D and length l due to viscous flow depends on velocity V, viscosity μ and density ρ. Using Buckingham's π theorem, obtain an expression for p.	10	CO4	K2
6.a.	Explain the construction and working principle of rotameter with neat sketch.	10	CO5	K2
	(OR)			
b.	Write the working of double acting reciprocating pump with neat sketch.	10	CO5	K2

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