Set-I

Model Answer Copy

G. S. Mandal's

Maharashtra Institute of Technology, Aurangabad

(An Autonomous Institute)

END SEMESTER EXAMINATION

Second Year B.Tech (Agricultural Engineering) – Feb/Mar-2023

Academic Year 2022-23 Semester-III

Class: S.Y. **Date:**
Course: Fluid Mechanics **Time: 2 hr**
Max Marks: 50

Q. 1	Answer any five(Marks:10)				
		Marks	CO	BL	PI
a)	Define Buoyancy (2 Marks)	2	CO1	BL1	
b)	What do you mean by fundamental units and derived units? Give example Define fundamental units(1/2 Marks) Define derived units(1/2 Marks) Give example(1Marks)	2	CO6	BL1	
c)	Define the term: Notch, Weir Define Notch(1Marks) Define Weir(1Marks)	2	CO3	1	
d)	Define Kinetic energy correction(1Marks) Define momentum correction factor(1Marks)	2	CO4	1	
e)	How to calculate rate of flow or discharge Write down steps with definition and mathematical express of discharge (2Marks)	2	CO2	2	
f)	What do you mean by dimensionless number Name any four Define dimensionless number(1Marks) Name any four(1Marks)	2	CO6	1	
g)	Write down Pascal's law(1Marks) Write Pascal's law with mathematical exapression and draw diagram to show pressure acting on fluid element(1Marks)	2	CO2	2	
h)	Define Reynold's Number (1Marks) Mathematical Expression (1Marks)	2	CO6	1	
Q.2	A rectangular plane surface is 2 m wide and 3 m deep. It lies in vertical plane in water. Determine the total pressure and	8	CO3	3	

	position of centre of pressure on the plane surface when its upper edge is horizontal and a. coincides with water surface , b. 2.5 m below the free water surface Write down Give values and what to calculate(2Marks) Write down Formula(2Marks) Steps of calculation(2Marks) Correct Answer with units(2Marks)				
Q.3	Explain the principle of venturimeter with neat sketch. Derive the expression for the rate of flow of fluid through it Define Venturmeter(2 Marks) Draw Diagram(2 Marks) Write down expression for the rate of flow of fluid through it(4 Marks)	8	CO4	3	
Q.4	What is Euler's equation? how will you obtain Bernoulli's equation from it Define Euler's equation (4 Marks) obtain Bernoulli's equation from it (4 Marks)	8	CO4	3	
Q.5	Find an expression for the discharge over a rectangular weir in terms of head of water over the crest of the weir Draw diagram (2Marks) Write down detail expression with steps (6Marks) **OR**(optional) Determine the height of a rectangular weir of length 6 m to be built across a rectangular channel. The maximum depth of water on the upstream side of the weir is 1.8 m and discharge is 2000 lit/s. take $C_d = 0.6$ and neglect end contraction Write down Give values and what to calculate(2Marks) Write down Formula(2Marks) Steps of caiculation(2Marks) Correct Answer with units(2Marks)	8	CO5	3	
Q.6	State and describe Buckingham's π-theorem Write down Theorem(4 Marks) Describe with details (4 Marks) **OR**(optional) What are the methods of dimensional analysis? Describe the Rayleigh's method for dimensional analysis **Define** methods of dimensional analysis(4 Marks) Describe the Rayleigh's method for dimensional analysis (4 Marks)	8	CO6	3	