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Department of Biotechnology

DEPARTMENT OF BIOTECHNOLOGY

Date	07-11-2025	Maximum Marks	50+10
Course Code	BT234AI	Duration	120 Min
Sem	III	CIE-1	
Title: - UNIT OPERATIONS			

Instructions for the candidate:

Answer all questions.

S. No	QUIZ 1	MKS	CO	BTL
1	Define Uniform and Non uniform flow.	02	1	1
2	State and write the Bernoulli's theorem for steady state flow of an incompressible fluid.	02	3	2
3	Mention the numerical values for Reynolds number for laminar flow and turbulent flow.	02	1	1
4	Find the pressure intensity at a depth of 30 m below the free surface of water.	02	3	1
5	What will be the difference in pressure head, measured by a mercury-oil differential U tube manometer showing a 22 cm difference in mercury levels, if the specific gravity of oil is 0.8?	02	3	1

S. No	TEST 1	MKS	CO	BTL
1 a)	Explain Newtonian and non-Newtonian fluids using a graphical representation.	06	2	1
b)	Derive continuity equation for compressible fluids	04	3	1
2	What is a manometer? Explain about differential U tube manometer with a neat sketch and write its expression.	10	2	1
3 a)	Define fluid kinematics and Newton's law of viscosity	02	1	1
b)	Derive an equation for hydrostatic equilibrium	08	3	1
4	A simple U-tube manometer containing mercury is connected to a pipe in which an oil of specific gravity 0.80 is flowing. The pressure in the pipe is vacuum. The other end of the manometer is open to atmosphere, find the vacuum pressure in pipe if the difference of mercury level in two limbs is 200 mm and height of oil in left end from the centre of pipe is 150 mm below	10	3	1
5	The water is through pipe having diameters 20 cm and 15 cm at sections 1 and 2 respectively. The rate of flow through pipe is 40 liters/sec. The section1 is 6 m above datum line and section 2 is 3 m above datum line. If the pressure intensity at section 1 is 29.43 is N/cm^2, estimate the pressure intensity at section 2.	10	3	1