

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: BTECH
BRANCH: CHEM**

**SEMESTER: III
SESSION: MO/2023**

SUBJECT: CL203 FLUID MECHANICS

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
 2. Candidates attempt for all 25 marks.
 3. Before attempting the question paper, be sure that you have got the correct question paper.
 4. The missing data, if any, may be assumed suitably.
 5. Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.
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			CO	BL
Q1	A simple manometer is used to measure the pressure of oil (sp. Gr. = 0.8) flowing in a pipeline. Its right limb is open to the atmosphere and left limb is connected to the pipe. The centre of the pipe is 9 cm below the level of mercury (sp. Gr. = 13.6) in the right limb. If the difference of mercury level in the two limbs is 15 cm, determine the absolute pressure of the oil in the pipe in N/cm ² .	[5]	CO1	BL3
Q2	Derive an expression for the force exerted on a sub-merged vertical plane surface by the static liquid and locate the position of centre of pressure.	[5]	CO1	BL3
Q3	(a) What is a manometer? How are they classified?	[2]	CO1	BL1
Q3	(b) Explain the concept of boundary layer.	[3]	CO2	BL1
Q4	(a) Sketch stress versus strain diagram for Newtonian and Non-Newtonian fluid with example.	[3]	CO2	BL2
Q4	(b) What is turbulence in fluid flow? Explain the nature and quantification of turbulence	[2]	CO2	BL2
Q5	Derive an expression for Bernoulli's equation.	[5]	CO3	BL2

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