

PART 1 - PHYSICS

Topic : Mechanical properties of fluids, Electrostatic potential and capacitance

SECTION-B : (Maximum Marks : 8)

This section contains **ONE** paragraph.

Based on each paragraph, there are **TWO** questions.

The answer to each question is a **NUMERICAL VALUE**.

For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) in the place designated to enter the answer.

Answer to each question will be evaluated according to the following marking scheme :

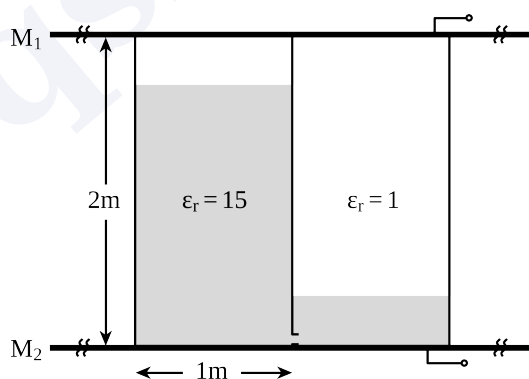
Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

Paragraph for Questions 1 and 2

A container of height 2 m, length 2 m and breadth 1 m is made of insulating vertical walls and two large area horizontal metal plates (M_1 and M_2) which extend far beyond the vertical walls in all directions. The container is partitioned into two equal chambers with a thin insulating vertical wall. The partition wall contains a small hole of cross-sectional area $\sqrt{10} \text{ cm}^2$ near its bottom edge. Initially the hole is closed and the left chamber of the container is completely filled with a liquid of dielectric constant $\epsilon_r = 15$ and the right chamber is empty ($\epsilon_r = 1$). At time $t = 0$, the hole is opened and the liquid flows from the left chamber to the right chamber. In both the chambers, the space above the liquid has $\epsilon_r = 1$ and is maintained at atmospheric pressure. The schematic of the container at a time $t > 0$ is shown in the figure.

[Given: acceleration due to gravity is 10 m s^{-2} .]



1. The height (in m) of the liquid in left chamber at $t = 500 \text{ s}$ is:

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Space for Rough Work

2. The difference in the capacitance (in F) between the metal plates at $t = 0$ and that at $t = 500$ s is $(8 - n)\epsilon_0$, where ϵ_0 is the permittivity of free space. The value of n is:

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**JEE ADVANCED ELECTROSTATIC POTENTIAL AND
CAPACITANCE — EFFECT OF DIELECTRIC ON
CAPACITANCE — PYQS**

Test Pattern : JEE (Advanced)

ANSWER KEY**SECTION-B**

Ques.	1	2								
Ans.	1.25	1.90 to 2.10								