TEST – 04

Fluid Mechanics

Time:50min

Que-A) 2 MARKS QUESTIONS : 😇

1) Define surface tension.
2) Does Archimedes principle hold in a vessel in a free fall?

Que-B) 3 MARKS QUESTIONS : 😐

1) Explain why
(a) The angle of contact of mercury with glass is obtuse, while that of water with glass is acute.
(b) Water on a clean glass surface tends to spread out while mercury on the same surface tends to form drops. (Put differently, water wets glass while mercury does not.)
(c) A drop of liquid under no external forces is always spherical in shape.

2) A hydraulic automobile lift is designed to lift cars with a maximum mass of 3000 kg. The area of cross-section of the piston carrying the load is 425 cm^2. What maximum pressure would the smaller piston have to bear?

Que-B) 5 MARKS QUESTIONS :(Attempt any one) ☹

1) What is the pressure inside a drop of mercury of radius 3.0 mm at room temperature? Surface tension of mercury at that temperature (20°C) is 4.65×10^{-1} Nm^{-1}. The atmospheric pressure is 1.01×10^5 Pa. Also give the excess pressure inside the drop.

OR

2) Derive Bernoulli's Equation .

OR

3) Derive formula of terminal velocity .

OR

4) A U tube contains water and methylated spirit separated by mercury. The mercury columns in the two arms are in level with 10.0 cm of water in one arm and 12.5 cm of spirit in the other. What is the relative density of spirit?