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TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

PHYSICS

DPP

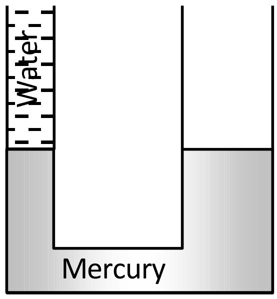
DAILY PRACTICE PROBLEMS

DPP NO. 1

PHYSICS: Fluid & Mechanics

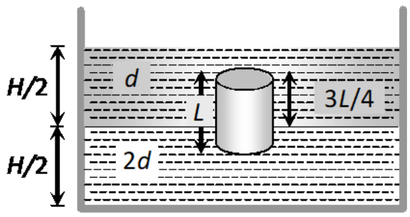
DPP No. : 1

1. A U-tube in which the cross-sectional area of the limb on the left is one quarter, the limb on the right contains mercury (density 13.6 g/cm^3). The level of mercury in the narrow limb is at a distance of 36 cm from the upper end of the tube. What will be the rise in the level of mercury in the right limb if the left limb is filled to the top with water



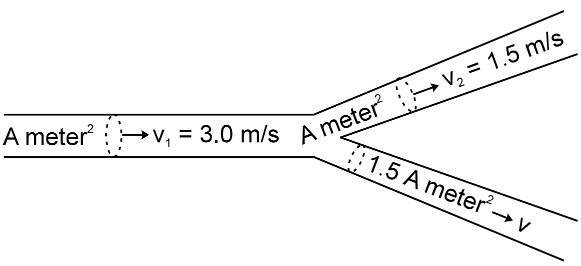
(1) 1.2 cm (2) 2.35 cm (3) 0.56 cm (4) 0.8 cm

2. A homogeneous solid cylinder of length L(L < H/2). Cross-sectional area A/5 is immersed such that it floats with its axis vertical at the liquid-liquid interface with length L/4 in the denser liquid as shown in the fig. The lower density liquid is open to atmosphere having pressure P_0. Then density D of solid is given by



(1) $\frac{5}{4}d$ (2) $\frac{4}{5}$ (3) d (4) $\frac{d}{5}$

3. An incompressible liquid flows through a horizontal tube as shown in the figure. Then the velocity ' v ' of the fluid is :



(1) 3.0 m/s (2) 1.5 m/s (3) 1.0 m/s (4) 2.25 m/s

4. Following are some statements about buoyant force: (Liquid is of uniform density)

(i) Buoyant force depends upon orientation of the concerned body inside the liquid.

(ii) Buoyant force depends upon the density of the body immersed.

(iii) Buoyant force depends on the fact whether the system is on moon or on the earth.

(iv) Buoyant force depends upon the depth at which the body (fully immersed in the liquid) is placed inside the liquid.

Of these statements :

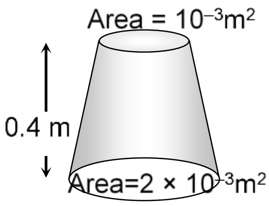
(1) Only (i), (ii) and (iv) are correct. (2) Only (ii) is correct.

(3) Only (iii) and (iv) are correct. (4) (i), (ii) and (iv) are incorrect.

5. An inverted bell lying at the bottom of a lake 47.6 m deep has 50 cm^3 of air trapped in it. The bell is brought to the surface of the lake. The volume if the trapped air will be (atmospheric pressure = 70 cm of Hg = 13.6 g/cm^3)

(1) 350 cm^3 (2) 300 cm^3 (3) 250 cm^3 (4) 22 cm^3

6. A uniformly tapering vessel is filled with a liquid of density 900 kg/m^3. The force that acts on the base of the vessel due to the liquid is ($g = 10\ ms^{-2}$)



(1) 3.6 N (2) 7.2 N (3) 9.0 N (4) 14.4 N

7. There is a hole in the bottom of tank having water. If total pressure at bottom is 3 atm (1 atm = 10^5 N/m^2) then the velocity of water flowing from hole is

(1) $\sqrt{400}$ m/s (2) $\sqrt{600}$ m/s (3) $\sqrt{60}$ m/s (4) None of these

8. Two solids A and B float in water. It is observed that A floats with half its volume immersed and B floats with 2/3 of its volume immersed. Compare the densities of A and B

(1) 4 : 3 (2) 2 : 3 (3) 3 : 4 (4) 1 : 3

9. Density of the ice is ρ and that of water is σ. What will be the decreasein volume when a mass M of ice melts.

(1) $\frac{M}{\sigma-\rho}$ (2) $\frac{\sigma-\rho}{M}$ (3) $M\left[\frac{1}{\rho}-\frac{1}{\sigma}\right]$ (4) $\frac{1}{M}\left[\frac{1}{\rho}-\frac{1}{\sigma}\right]$

10. Two non-mixing liquids of densities ρ and $n\rho$ ($n > 1$) are put in container. The height of each liquid is h. A solid cylinder of length L and density d is put in this container. The cylinder floats with its axis vertical and length pL ($p < 1$) in the denser liquid. The density d is equal to

(1) $\{1 + (n - 1)p\}\rho$ (2) $\{1 + (n + 1)p\}\rho$ (3) $\{2+(n + 1)p\}\rho$ (4) $\{2 + (n - 1)p\}\rho$