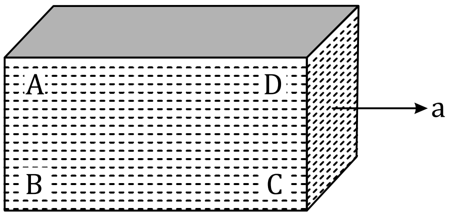
DPP 01

Q.1 A closed rectangular tank is completely filled with water and is accelerated horizontally with an acceleration a towards right. Pressure is (i) maximum at, and (ii) minimum at



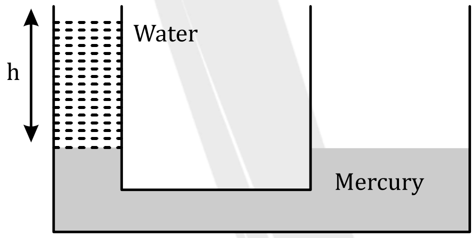
(A) (i) B (ii) A (B) (i) C (ii) D

(C) (i) B (ii) C (D) (i) B (ii) D

Q.2 A triangular lamina of area A and height h is immersed in a liquid of density ρ in a vertical plane with its base on the surface of the liquid. The thrust on the lamina is

(A) $\frac{1}{2}A\rho gh$ (B) $\frac{1}{3}A\rho gh$ (C) $\frac{1}{6}A\rho gh$ (D) $\frac{2}{3}A\rho gh$

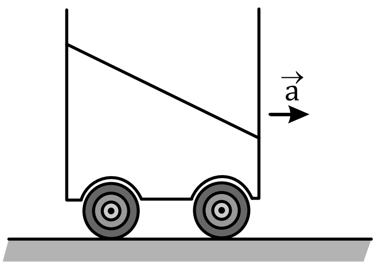
Q.3 Two communicating vessels contain mercury. The diameter of one vessel is n times larger than the diameter of the other. A column of water of height h is poured into the left vessel. The mercury level will rise in the right-hand vessel (s = relative density of mercury and ρ = density of water) by



(A) $\frac{h}{(n^2+1)s}$ (B) $\frac{n^2h}{(n+1)^2s}$ (C) $\frac{h}{(n+1)^2s}$ (D) $\frac{h}{n^2s}$

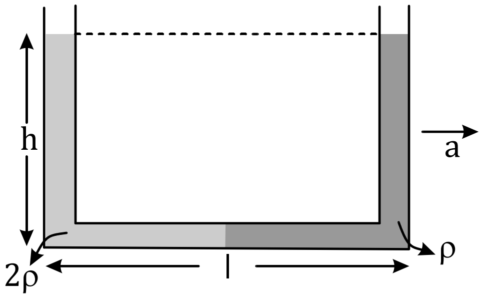
Q.4 An open water tanker moving on a horizontal straight road has a cubical block of cork floating over its surface.

If the tanker has an acceleration of a as shown, the acceleration of the cork w.r.t. container is



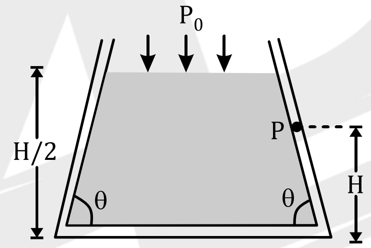
(A) $\frac{a}{y}\sqrt{g^2 - a^2}$ (B) $\frac{a^2}{g}$ (C) zero (D) a

Q.5. A U-tube of base length ' l ' filled with same volume of two liquids of densities ρ and 2ρ is moving with an acceleration a on the horizontal plane. If the height difference between the two surfaces (open to atmosphere) becomes zero, then the height h is given by



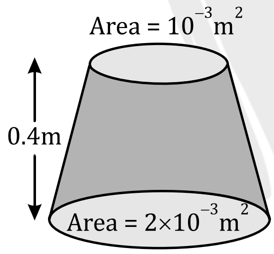
(A) $\frac{a}{2g}l$ (B) $\frac{3a}{2g}l$ (C) $\frac{a}{g}l$ (D) $\frac{2a}{3g}l$

Q.6 A container shown in figure contains a liquid to a depth H, and of density ρ. The gauge pressure at point P is:



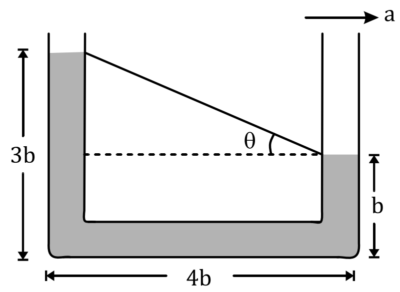
(A) $\frac{\rho g H}{2+P_0}$ (B) $\frac{\rho g H \cos\theta}{2}$ (C) $\frac{\rho g H}{2\cos\theta}$ (D) $\frac{\rho g H}{2}$

Q.7 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 ($g = 10\ ms^{-2}$)



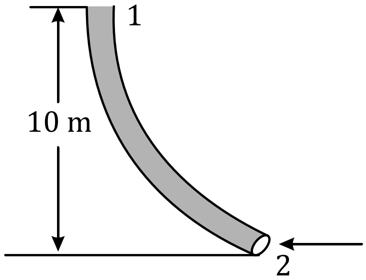
(A) 3.6 N (B) 9.0 N (C) 7.2 N (D) 14.4 N

Q.8 The acceleration a of the vertical U-tube is

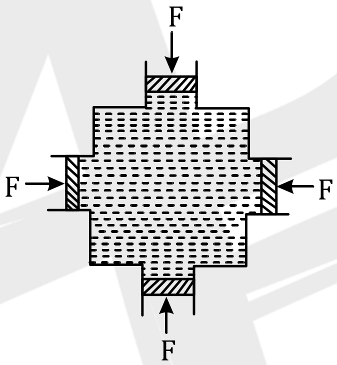


(A) g/2 (B) g (C) 2g (D) zero

Q.9 Find the force (in N) acting on the piston of 3 cm^2 at point 2 due to the water column of height 10 m.



Q.10 In the figure shown, water is filled in a symmetrical container. Four pistons of equal area A are used at the four openings to keep the water in equilibrium. Now an additional force F is applied at each piston. The increase in the pressure at the centre of the container due to this addition is



(A) 0 (B) $\frac{2F}{A}$ (C) $\frac{4F}{A}$ (D) $\frac{F}{A}$

ANSWER KEY

1.	(D)	**2.**	(B)	**3.**	(A)	**4.**	(C)	**5.**	(B)	**6.**	(D)	**7.**	(C)
8.	(A)	**9.**	(30)	**10.**	(D)								