Board – ICSE	Class – 9th	Topic – UPTHRUST IN FLUIDS, ARCHIMEDES PRINCIPLE & FLOATATION 1

1. A cylindrical solid of area of cross section 0.0004 m^2 and length 0.30 m is completely immersed in water. Calculate
   (i) Weight of solid in S.I. system
   (ii) Upthrust acting on solid in S.I system
   (iii) Appearent weight of solid in (a) water (b) alcohol.
   [Take g = 10 ms^{-2} ; density of water = 1000 kgm^{-3}; Density of alcohol = 780 kgm^{-3}; Density of solid = 1500 kgm^{-3}]
2. A stone of density 3000 kgm^3 is lying submerged in water of density 1000 kgm^3. If the mass of stone in air is 150 kg, calculate the force required to lift the stone. [g = 10 ms^2]
3. A glass cylinder of length 12 x 10^{-2} m and area of cross section 5 x 10^{-4} m^2 has a density of 2500 kgm^{-3}. It is immersed in a liquid of density 1500 kgm^{-3}, such that 3/8. of its length is above liquid. Find the apparent weight of glass cylinder in newtons.
4. A solid weighs 0.08 kgf in air and 0.065 kgf in water.Find
   (1) R.D. of solid
   (2) Density of solid in SI system. [Density of water = 1000 kgm^3]
5. A solid of R.D. 2.5 is found to weigh 0.120 kgf in water. Find the wt. of solid in air.
6. A sinker is found to weigh 56.7 gf in water. When the sinker is tied to a cork of weight 6 gf, the combination is found to weigh 40.5 gf in water. Calculate R.D. of cork.
7. An aluminium cube of side 5 cm and RD. 2.7 is suspended by a thread in alcohol of relative density 0.80. Find the tension in thread.
8. A hollow cylinder of copper of length 25 cm and area of cross-section 15 cm^2, floats in water with 3/5 of its length inside water. Calculate :
   i. apparent density of hollow copper cylinder.
   ii. wt. of cylinder.
   iii. extra force required to completely submerge it in water.
9. A cork cut in the form of a cylinder floats in alcohol of density 0.8 gcm^{-3}, such that 3/4 of its length is outside alcohol. If the total length of cylinder is 35 cm and area of cross-section 25 cm^2, calculate :
   (i) Density of cork

(ii) Wt. of cork

(iii) Extra force required to submerge it in alcohol

10. An iceberg floats in sea water of density 1.17 g cm ^{3}, such that 2/9 of its volume is above sea water. Find the density of iceberg.
11. What fraction of an iceberg of density 910 kgm^{-3} will be above the surface of sea water of density 1170 kgm^{-3} ?
12. A balloon of volume 100 m^{3} is filled with hot air of density 0.40 kgm^{-3}. If the fabric of balloon weighs 16 kgf and equipment P is attached to it, such that balloon is in the state of equilibrium, calculate
    (i) Wt. of only hot air
    (ii) Wt. of hot air and balloon
    (iii) Wt. of hot air , balloon and equipment
    (iv) Wt. of cold air displaced

    Weight of equipment of P, when density of cold air is 1.3 kgm^{-3}
13. A test tube loaded with lead shots, floats to the mark X in water. The test tube along with lead shots, weighs 30 gf. When the test tube is made to float in brine, 4.5 g of load shots are added in it, to make it float upto the level X. Find the R.D. of brine.