

1. The density of aluminum is 2700 kg/m^3 . The cylinder is in the shape of a cylinder. The diameter of the cylinder is 20 cm and its height is 45 cm. Determine the mass of the aluminum cylinder.
2. Determine the radius of a 5 kg iron sphere. (Density of iron = 7860 kg/m^3)
3. Mention at least two ways of determining the density of an object.
4. Determine the absolute pressure at a depth of 35 m under sea water. The density of sea water is 1000 kg/m^3 .
5. The gauge pressure due to a liquid is 20000 Pa. Determine the height of the liquid.
6. Determine the force on a circle of radius 1.5 m at a depth of 20 m under water ($\rho = 1000 \text{ kg/m}^3$).
7. In a hydraulic jack, a force of 100 N is applied on the piston that is 0.05 m in diameter. The piston that supports the load has a diameter of 0.4 m. Determine the weight of the load.
8. An unknown liquid is used in a barometer. When the outside pressure is 102000 Pa, the height of the liquid in the barometer is 0.8 m. Determine the density of the liquid.
9. A $5 \text{ cm} \times 10 \text{ cm} \times 20 \text{ cm}$ brick of density 2500 kg/m^3 is placed on each of its surfaces. Determine the pressure due to its weight for each of these surfaces and label them from lowest to the highest.
10. Determine the gauge pressure at a depth of 25 m under sea-water ($\rho = 1025 \text{ kg/m}^3$).
11. A spherical object of radius 5 cm is completely submerged in water ($\rho = 1000 \text{ kg/m}^3$). Determine the buoyant force on the object.
12. An iron sphere of density 7860 kg/m^3 and radius 10 cm is completely submerged in water ($\rho = 1000 \text{ kg/m}^3$). Determine the apparent weight of the sphere.
13. An object weighs 100 N in air, 85 N in water and 95 N in an unknown liquid. Determine the density of the object. Determine the density of the unknown liquid.
14. An object weighs 50 N in air and 45 N in an unknown liquid of density 1200 kg/m^3 . Determine the apparent weight of the object when fully submerged in water.
15. A hot air balloon is used to lift an cargo of mass 200 kg. The density of the surrounding air is 1.29 kg/m^3 and the density of the air inside the balloon is 0.99 kg/m^3 . Determine the volume of the balloon required to just lift the load.
16. A balloon filled with helium is used to lift an cargo of mass 200 kg. The density of the surrounding air is 1.29 kg/m^3 and the density of the helium is 0.179 kg/m^3 . Determine the volume of the balloon required to just lift the load.
17. A water tunnel has a circular cross section where the diameter diminishes from 5.6 m to 2.8 m. If the velocity of water is 5.0 m/s in the larger part of the tunnel, what is the velocity of water in the smaller part of the tunnel?
18. The diameter of the circular cross section of a pipe at one end is 0.08 m where the velocity of the fluid is 4 m/s. Determine the diameter at the end where the fluid velocity is 20 m/s.
19. A spherical balloon of radius 0.4 m is filled with helium of density 0.179 kg/m^3 . How many balloons will be required to just lift a load of mass 80 kg. If the number of balloons were doubled, determine the acceleration with which the entire system will travel upward.
20. A raft of density 650 kg/m^3 is floating in sea-water of density 1025 kg/m^3 . What percentage of the raft is exposed?
21. The surface area of a rectangular raft is 25 m^2 . The density of the raft is 800 kg/m^2 . The density of the water is 1000 kg/m^2 . A vehicle of mass 800 kg rolls onto the raft. Determine the additional distance this raft is further submerged in water.