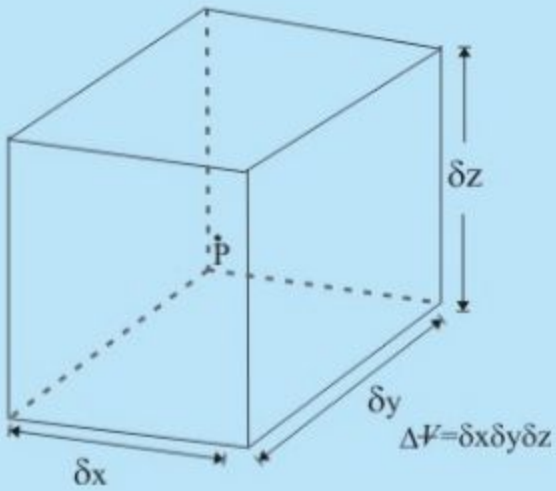
Fluid Properties :

Characteristics of a continuous fluid which are independent of the motion of the fluid are called basic properties of the fluid. Some of the basic properties are as discussed below.

Property	Symbol	Definition	Unit
Density	ρ	The density *p* of a fluid is its mass per unit volume . If a fluid element enclosing a point *P* has a volume ΔV and mass Δm (Fig. 1.4), then density (ρ)at point *P* is written as $\rho = \lim_{\Delta\forall \to \Delta\forall_C} \left(\frac{m}{\Delta\forall}\right)$ However, in a medium where continuum model is valid one can write - $\rho = \lim_{\Delta\forall \to 0} \left(\frac{m}{\Delta\forall}\right) = \left[\frac{dm}{d\forall}\right]_{\forall}$ (1.3)  **Fig 1.4 A fluid element enclosing point P**	kg/m^3
Specific Weight	γ	The **specific weight** is the weight of fluid per unit volume. The specific weight is given by $\gamma = \rho g$ (1.4) Where *g* is the gravitational acceleration. Just as weight must be clearly distinguished from mass, so must the specific weight be distinguished from density.	N/m^3
Specific Volume	**v**	The **specific volume** of a fluid is the volume occupied by unit mass of fluid. Thus $v = \frac{1}{\rho}$ (1.5)	m^3 /kg
Specific Gravity	s	For liquids, it is the ratio of density of a liquid at actual conditions to the density of pure water at 101 kN/m^2 , and at 4°C. The specific gravity of a gas is the ratio of its density to that of either hydrogen or air at some specified temperature or pressure. **However, there is no general standard; so the conditions must be stated while referring to the specific gravity of a gas.**	–