

- 3 (a) Define *density*.

.....[1]

- (b) Liquid of density ρ fills a container to a depth h , as illustrated in Fig. 3.1.

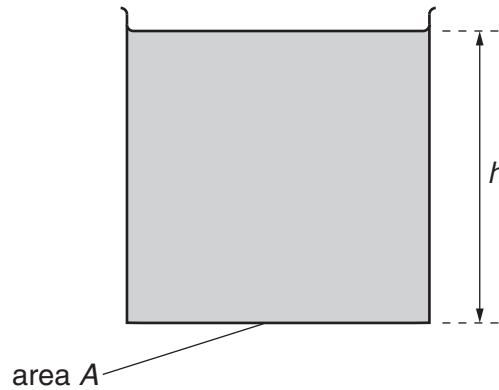


Fig. 3.1

The container has vertical sides and a base of area A .

- (i) State, in terms of A , h and ρ , the mass of liquid in the container.

.....[1]

- (ii) Hence derive an expression for the pressure p exerted by the liquid on the base of the container. Explain your working.

[2]

- (c) The density of liquid water is 1.0 g cm^{-3} . The density of water vapour at atmospheric pressure is approximately $\frac{1}{1600} \text{ g cm}^{-3}$.

Determine the ratio

(i) $\frac{\text{volume of water vapour}}{\text{volume of equal mass of liquid water}},$

ratio =[1]

(ii) $\frac{\text{mean separation of molecules in water vapour}}{\text{mean separation of molecules in liquid water}}.$

ratio =[2]

- (d) State the evidence for

- (i) the molecules in solids and liquids having approximately the same separation,

.....
.....[1]

- (ii) strong rigid forces between molecules in solids.

strong:

rigid:[2]