Chapter 2 - Physical Quantities and Measurement

A. Objective Questions

1. Write true or false for each statement

(a) Equal volumes of the two different substances have equal masses.

Solution: False.

(b) The density of a piece of brass will change by changing its size or shape.

Solution: False.

(c) The density of a liquid decreases with increase in its temperature.

Solution: True.

(d) Relative density of water is 1.0.

Solution: True.

(e) Relative density of a substance is expressed in gm-3.

Solution: False.

(f) When a body is immersed in a liquid, the buoyant force experienced by the body is equal to the volume of the liquid displaced by it.

Solution: False.

(g) A body experiences the same buoyant force while floating in water or alcohol.

Solution: True.

(h) A body experiences the same buoyant force when it floats or sinks in water.

Solution: False.

(i) A body floats in a liquid when its weight becomes equal to the weight of the liquid displaced by its submerged part.

Solution: True.

(j) A body while floating, sinks deeper in a liquid of low density than in a liquid of high density.

Solution: True.

2. Fill in the blanks

(a) 1kg is the mass of **1000 ml** of water at 4°C.

(b) Mass = density × **volume**.

(c) The S.I. unit of density is **Kg m^{-3}**

(d) Density of water is **1000** Kg m^{-3}

(e) 1 g cm-3 = **1000** Kgm^{-3}

(f) The density of a body which sinks in water is **more** than 1000 Kg

(g) A body sinks in a liquid A; but floats in a liquid. The density of liquid is **less** than the density of liquid B

(h) A body sinks in water, but a body Y floats on water. The density of the body is **more** than the density of the body.

(i) The buoyant force experienced by a body when floating in salt-water is **equal** to or same that of when floating in pure water.

(j) The weight of a body floating in a liquid is **zero.**

3. Match the following

 Column A   Column B

(a) Kg m^{-3} (i) relative density

(b) no unit   (ii) sinks in alcohol

(c) relative density   (iii) floats on water

(d) iron   (iv) density

(e) Wood   (v) density bottle

Solution:

Column A   **Column B**

(a) Kg m^{-3} (iv) density

(b) no unit   (i) relative density

(c) relative density   (v) density bottle

(d) iron   (ii) sinks in alcohol

(e) Wood   (iii) floats on water

4. Select the correct alternative

(a) The correct relation is

1. Density   = Mass $\times$ Volume

2. Mass   = Density $\times$ Volume

3. Volume   = Density $\times$ Mass

4. Density   = Mass $+$ Volume

Solution: 2. Mass = Density $\times$ Volume

(b) The relative density of alcohol is 0.8 its density is

1. 0.8

2. 800 kg m^3

3. 800 g cm^3

4. 0.8 kg m^{-3}

Solution: 2. 800 kg m^3

(c) A block of wood of density 0.8gcm⁻³ has a volume of 60cm³. The mass of block is 1.

1. 60.8 g

2. 75 g

3. 48 g

4. 0.013 g

Solution: 3.48 g

(d) The density of aluminium is 2.7 gcm^3 and that of brass 8.4 gcm^3. The correct statement is

1. Equal masses of aluminium and brass have equal volumes

2. The mass of a certain volume of brass is more than the mass of equal volume of aluminium.

3. The volume of a certain mass of brass is more than the volume of equal mass of aluminium.

4. Equal volumes of aluminium and brass have equal masses.

Solution: 2. The mass of a certain volume of brass is more than the mass of equal volume of aluminium.

(e) A density bottle has a marking 25 mL on it. It means that:

1. the mass of density bottle is 25g

2. the density bottle will store 25 ml of any liquid in it

3. the density bottle will store 25 ml of water, but more volume of liquid denser than water.

4. the density bottle will store 25 ml of water, but more volume of a liquid lighter than water.

Solution: 2. the density bottle will store 25 ml of any liquid in it

(f) The correct statement is

1. The buoyant force on a body is equal to the volume of the liquid displaced by it

2. The buoyant force on a body is equal to the volume of the body

3. The buoyant force on a body is equal to the weight of the liquid displaced by it

4. The buoyant force on a body is always equal to the weight of the body.

Solution: 3. The buoyant force on a body is equal to the weight of the liquid displaced by it

(g) A piece of wood floats on water. The buoyant force on wood will be

1. zero

2. more than the weight of the wood piece

3. equal to the weight of the wood piece

4. less than the weight of the wood piece.

Solution: 3. equal to the weight of the wood piece

(h) The weight of a body is more than the buoyant force experienced by it, due to a liquid. The body will

 1. sink

2. float with its some part outside the liquid

3. float just below the surface of liquid

4. Float with whole of its volume above the surface of liquid.

Solution: 1. sink