

CLASS 8, CHAPTER 2. PHYSICAL QUANTITIES AND MEASUREMENT

ANSWER KEY

1. WRITE TRUE OR FALSE FOR THE FOLLOWING STATEMENTS:

(a) FALSE (b) FALSE (c) TRUE (d) FALSE (e) TRUE (f) TRUE

Fill in the blanks:

(a) 1000 ml (b) volume. (c) Kg m⁻³ (d) 1000Kg m⁻³ (e) 1000 Kgm⁻³
(f) more than (g) less (h) more (i) equal

Match the following:

Column A

Column B

(a) Kg

(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

SOLUTIONS TO NUMERICALS

DENSITY CAN BE DENOTED WITH ρ or d

1. Volume (V) = 8 cm^3

Mass (m) = 84 gram

Wanted: density (ρ or d)

Solution: $d = m / V = 84 \text{ gram} / 8 \text{ cm}^3 = 10.5 \text{ gram/cm}^3$.

2. Volume (V) = 5 cm^3 Density (ρ or d) = 250 g/cm^3

$d = m / V$

$d = \text{density}, V = \text{volume}, m = \text{mass}$

Mass of block: $m = \rho V = (250 \text{ g/cm}^3) (5 \text{ cm}^3) = 1250 \text{ gram}$.

3. Volume of water (V) = 35 cm^3

Mass of water (m) = 60 gram

density: ρ or $d = m / V = 60/35 = 1.71 \text{ gram/cm}^3$.

4. Mass (m) = 120 gram

Volume (V) = 60 cm^3

$d = m / V$

$d = 120 \text{ gram} / 60 \text{ cm}^3$; $d = 2 \text{ gram/cm}^3$.

5. Mass (m) = 316 gram

Volume (V) = volume of spilled water = 40 ml

Wanted : density

Mass = 316 gram = $316/1000 \text{ kg} = 0.316 \text{ kg}$

Volume = 40 ml = $40/1000 \text{ liters} = 4/100 \text{ litres} = 0.04 \text{ litres}$

1 litre = $1 \text{ dm}^3 = 1/1000 \text{ m}^3 = 0.001 \text{ m}^3$

0.04 litres = $(0.04) (0.001) \text{ m}^3 = 0.00004 \text{ m}^3$

Density:

ρ or $d = m / V = 0.316 \text{ kg} / 0.00004 \text{ m}^3 = 316 \text{ kg} / 0.04 \text{ m}^3 = 7900 \text{ kg/m}^3$.

6. Mass (m) = 300 gram

Volume (V) = volume of spilled water = 20 cm^3 .

Wanted : density $d = m / V = 300 \text{ gram} / 20 \text{ cm}^3 = 15 \text{ gram/cm}^3$.

7. Archimedes' principle states that the upward buoyant force that is exerted on a body immersed in a fluid, whether fully or partially submerged, is equal to the weight of the fluid that the body displaces. Archimedes' principle is a law of physics fundamental to fluid mechanics.

8. A body when immersed in water is acted upon by two forces:

- The weight of the body acting in the downward direction and
- The up thrust or buoyant force given by the liquid on the body acting in upward direction.

Depending on whether the weight of the body is more, or the up thrust is more, the body will float or sink.

9. It is a reference mark located on a ship's hull.

It indicated the maximum depth to which the vessel may be safely immersed when loaded with cargo.

10. An object will float if the gravitational (downward) force is less than the buoyancy (upward) force. So, in other words, an object will float if it weighs less than the amount of water it displaces.

This explains why a rock will sink while a huge boat will float. The rock is heavy, but it displaces only a little water. It sinks because its weight is greater than the weight of the small amount of water it displaces.

A huge boat, on the other hand, will float because, even though it weighs a lot, it displaces a huge amount of water that weighs even more. Plus, boats are designed specifically so that they will displace enough water to assure that they'll float easily.
