Density Questions for GCSE Physics

1. What is the formula for density?

Density = mass / volume

or $\rho = m / V$

2. How does increasing the mass of an object affect its density, assuming volume remains constant?

Increasing mass increases density

(density is proportional to mass)

3. How does increasing the volume of an object affect its density, assuming mass remains constant?

Increasing volume decreases density

(density is inversely proportion to volume)

4. A material has a mass of 200 g and a volume of 100 cm^3. What is its density in g/cm^3?

$\rho = m / V$

$= 200 / 100$

$= \mathbf{2\ g/cm^3}$

5. A block of wood has a density of 0.6 g/cm^3 and a volume of 500 cm^3. What is its mass?

$\rho = m / V$

$0.6 = m / 500$

$0.6 \times 500 = m$

$= \mathbf{300\ g}$

6. A metal cylinder has a mass of 780 g and a volume of 300 cm^3. What is its density?

$\rho = m / V$
$= 780 / 300$
$= \mathbf{2.6 g/cm^3}$

7. The density of water is 1000 kg/m^3. What is the mass of 2 m^3 of water?

$\rho = m / V$
$1000 = m / 2$
$2x\ 1000 =$ **2000 kg**

8. A rectangular block measures 10 cm × 5 cm × 2 cm and has a mass of 400 g. What is its density?

Volume = $10 \times 5 \times 2 = 100\ cm^3$
$\rho = m / V$
$= 400/100 =$ **$4 g/cm^3$**

9. A student measures a liquid's mass as 120 g and volume as 100 cm^3. What is its density?

$\rho = m / V$
$=120 / 100$
$=$ **$1.2\ g/cm^3$**

10. A material has a mass of 3 kg and occupies a volume of 0.002 m^3. What is its density in kg/m^3?

$\rho = m / V$
$= 3 / 0.002$
$=$ **$1500\ kg/m^3$**

11. The density of air is approximately 1.2 kg/m³. What is the mass of air in a room measuring 5 m × 4 m × 3 m?

Volume = 5 x 4 x 3 = 60 m^3

ρ = m / V

1.2 = m / 60 1.2 x 60 = **72kg**

12. List the apparatus that should be used to find the density of an irregular shaped object.

Balance, Displacement can, beaker, measuring cylinder

13. A piece of rock is placed in a measuring cylinder with 40 cm³ of water. The water level rises to 55 cm³. If the rock's mass is 30 g, what is its density?

Volume = 55 – 40 = 15 cm^3

ρ = m / V

= 30 / 15 = **2 g/cm^3**

14. A cube of metal has a side length of 4 cm and a mass of 400 g. What is its density?

Volume = 4 x 4 x 4 = 4^3 = 64 cm^3

ρ = m / V

= 400 / 64 = **6.25 g/cm^3**

15. A cube of side length 10 cm has a density of 2700 kg/m³. What is its mass in kg?

Convert to metres because density is in kg/m^3

Volume = 0.1 x 0.1 x 0.1 = 0.001 m^3

ρ = m / V

2700 = m / 0.001

2700 x 0.001 = m = **2.7 kg**