

8.1 Internal Structure and Density

Name: _____ Class: _____ Date: _____

Total: 10 marks

KEY WORDS density 密度

Objective

Build the skills to answer exam questions on **internal structure and density**.

You must be able to:

- define **density** 密度 as mass per unit volume, $\rho = \frac{m}{V}$
- relate a substance's density to the **spacing** and mass of its particles
- compare the densities of solids, liquids, and gases

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Density

$\rho = \frac{m}{V}$, measured in kg m^{-3} . Rearranged: $m = \rho V$.

■ Particle picture

Closely packed, more massive particles give a higher density. Gases have widely spaced particles, so they are far less dense than solids or liquids.

■ Example

A 240 g block of volume 30 cm^3 : $\rho = \frac{240}{30} = 8.0 \text{ g cm}^{-3}$.

2 Practice

2.1 A 240 g block has a volume of 30 cm^3 . Find its density.

[2]

2.2 State which state of matter is usually the least dense. [1]

2.3 A liquid has density 800 kg m^{-3} . Find the mass of 2.0 m^3 of it. [2]

3 Exam-style questions

3.1 Density is defined as [1]

- | | |
|---|---|
| A | B |
| C | D |
- A** mass $\times$ volume
B mass $\div$ volume
C volume $\div$ mass
D force $\div$ area

3.2 Which state of matter is usually the densest? [1]

- | | |
|---|---|
| A | B |
| C | D |
- A** gas
B liquid
C solid
D all are equal

3.3 A metal cube of side 0.10 m has a mass of 2.7 kg .

(a) Find its volume. [1]

(b) Find its density. [2]