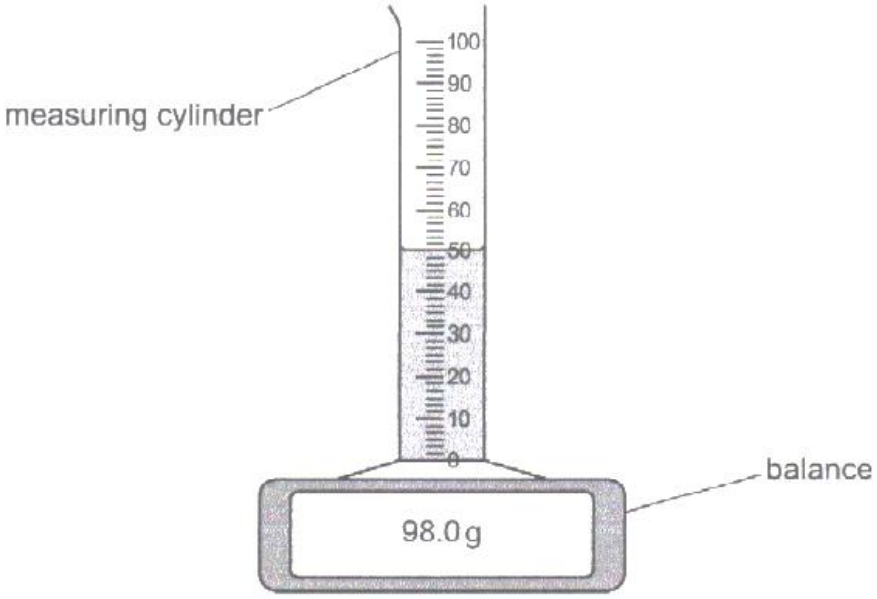
Pressure and density – Checkpoint Sec 1 Physics

1. No.13

Blessy calculates the density of a liquid.

She puts 50 cm^3 of the liquid in a measuring cylinder.

She puts the measuring cylinder on a balance.



(a) The unit of density is g / cm^3.

Write down the equation to calculate density.

density = $\frac{\text{mass}}{\text{volume}}$ [1]

(b) The mass of the empty measuring cylinder is 38.0 g.

The mass of the measuring cylinder and the liquid is 98.0 g.

(i) Calculate the **mass** of the liquid.

$98.0 - 38.0 = 60.0\,g$

mass of liquid 60.0 g [1]

(ii) The volume of the liquid is 50 cm^3.

Calculate the **density** of the liquid.

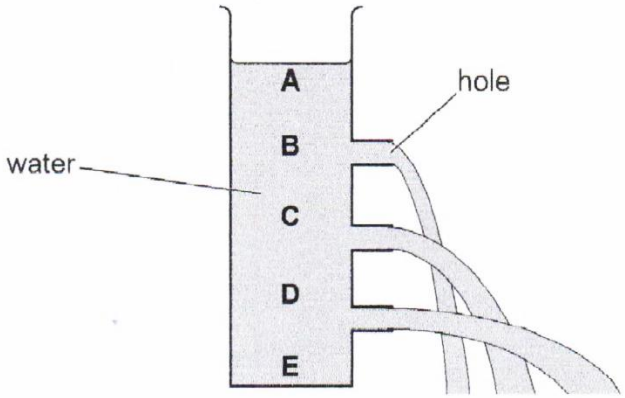
$\rho = \frac{60\,g}{50\,cm^3} = 1.2\,g/cm^3$

density of the liquid 1.2 g/cm^3 [1]

2. No.14

Lily investigates water pressure.

(a) Water is inside a container with holes in one side.



Where is the water pressure the **greatest**?

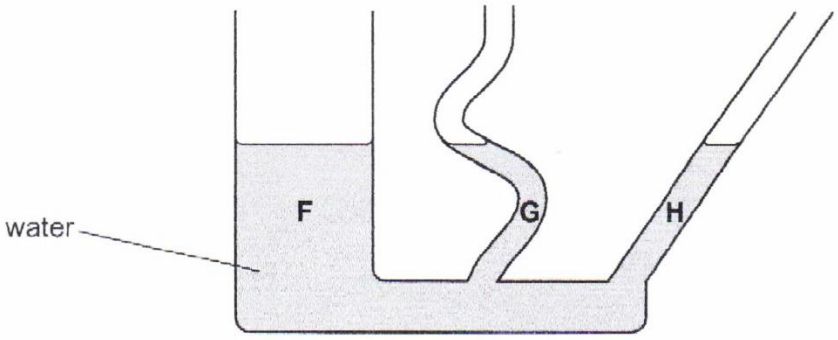
Pressure increases with depth.

Circle the correct answer.

A B C D (E)

[1]

(b) Water is inside a different shaped container.



Compare the water pressure at **F**, **G** and **H**.

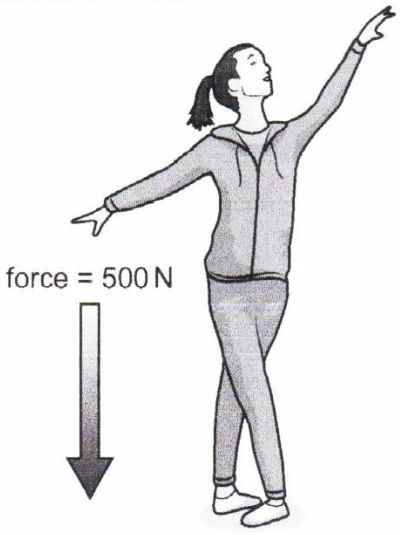
– Pressure is the same since they are all at the same height. [1]

3. No.13

Mia is a dancer.

The force she exerts on the floor is 500 N.

(a) She stands with both feet flat on the floor.



The area of her shoes in contact with the floor is 400 cm^2.

Calculate the pressure she exerts on the floor.

$P = \frac{F}{A}$

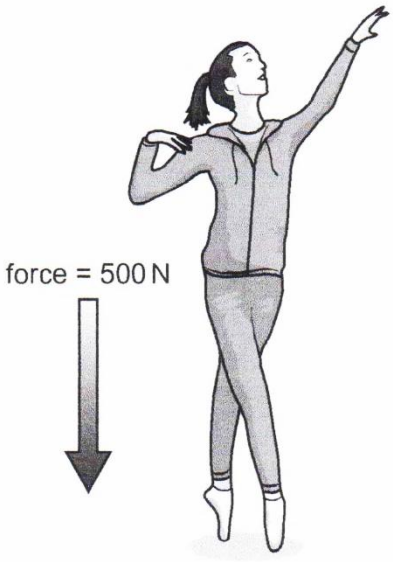
$= \frac{500N}{400\,cm^2}$

$= 1.25\,N/cm^2$

pressure 1.25 N/cm^2 [2]

(b) Mia stands on the points of her feet.

Her new area of contact with the floor is 10 cm^2 rather than 400 cm^2.



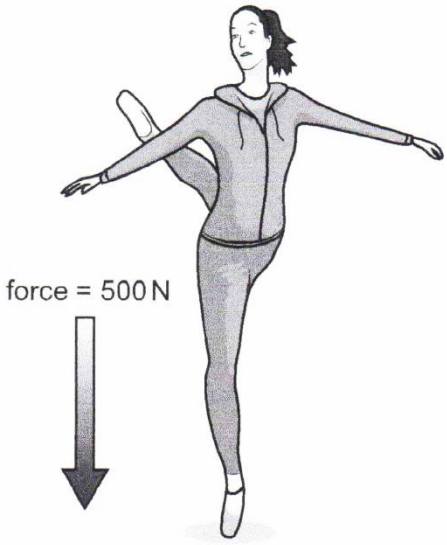
$P = \frac{500\,N}{10\,cm^2}$

$= 50\,N/cm^2$

Describe what happens to the pressure she exerts on the floor.

Weight is acting in a small area, so pressure increases to $50\,N/cm^2$ from $1.25\,N/cm^2$ [1]

(c) Mia balances on one point.



$P = \frac{500\,N}{5\,cm}$

$= 100\,N/cm^2$

(very high pressure)

She **cannot** remain on one point for a long time because it may damage her toes.

Suggest why this may damage her toes.

too much pressure is acting on her toes which is a very small area. [1]

4. No.10

Mike explains that different materials have different densities.

He says,

'Materials that are less dense than water will float.

Water has a density of 1 g/cm^3.'

He finds out the densities of different materials.

material	density in g/cm^3
gold	19.3
plastic	1.05
pumice stone	0.251
silver	10.5
wood	0.715

(a) Predict which **two** materials will float.

Choose from the table.

pumice stone **and** wood [1]

(b) Mike collects some water from the sea.

He tries to float the materials from the table in the seawater.

Now **three** of these materials float.

Use information from the table to explain why.

– The plastic will float in sea water since it has a higher density than water. [2]

5. No.3

Carlos calculates the density of an object.

(a) The object has a mass of 450 g.

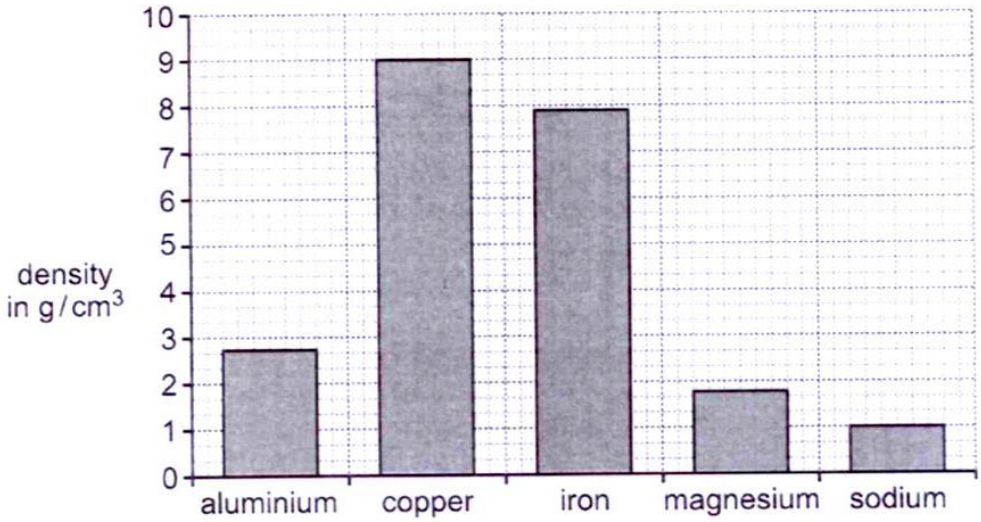
The object has a volume of 50 cm^3.

Calculate the density of the object.

density = $\frac{\text{mass}}{\text{volume}} = \frac{450\,g}{50\,cm^3} = 9.0\,g/cm^3$

density 9.0 g/cm^3 [3]

(b) Carlos knows the densities of different metals.



Carlos has a piece of each of the five metals.

Each piece of metal has the same volume.

Which piece of metal has the **greatest** mass?

Circle the correct answer.

aluminium

copper ← has the greatest density

iron

magnesium

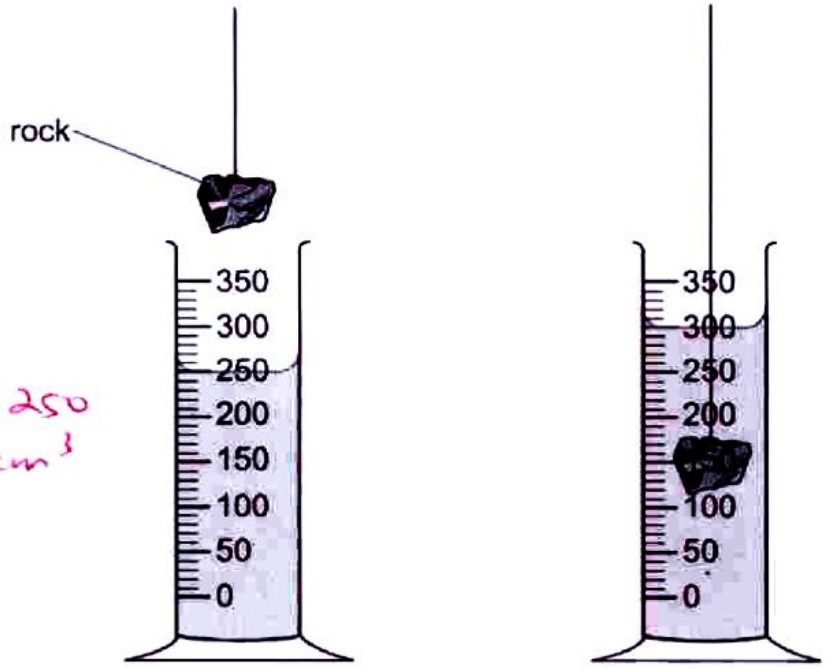
sodium

[1]

6. No.3

Measuring cylinders are used to measure volume.

Look at the diagram.



Vol = 300 − 250
= 50 cm³

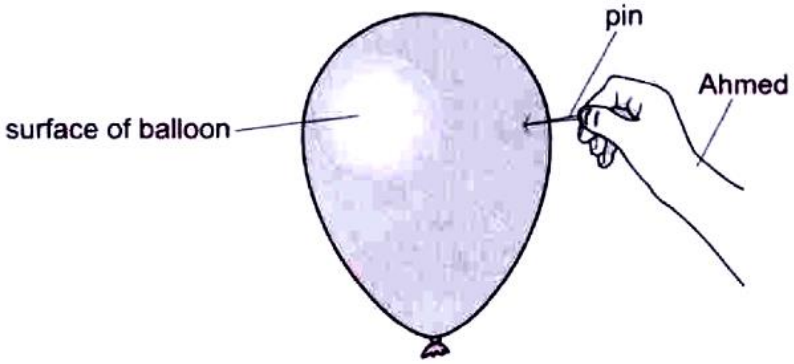
What is the volume of the piece of rock?

50 ..... cm³ [1]

7. May/2019/Paper_ 2/No.14

Ahmed is learning about pressure.

He pushes a pin on the surface of a balloon.

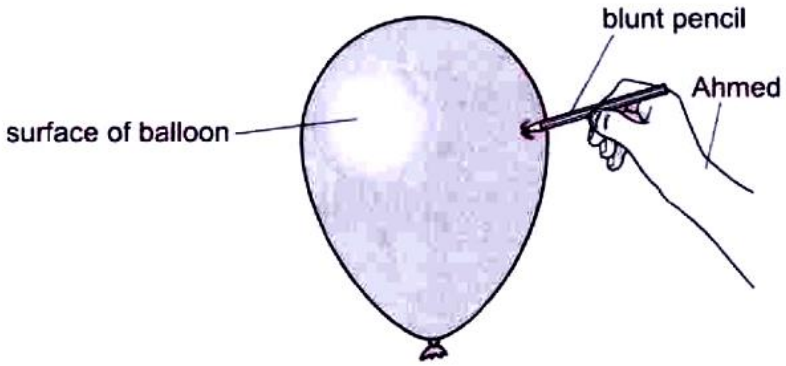


The balloon bursts (pops).

Ahmed repeats the investigation with an identical balloon.

He does **not** use a pin.

He pushes a blunt pencil with the same force.



The balloon does **not** burst.

Explain why the balloon does **not** burst.

pencil has larger tip area, so it exerts less pressure on the balloon. [2]

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