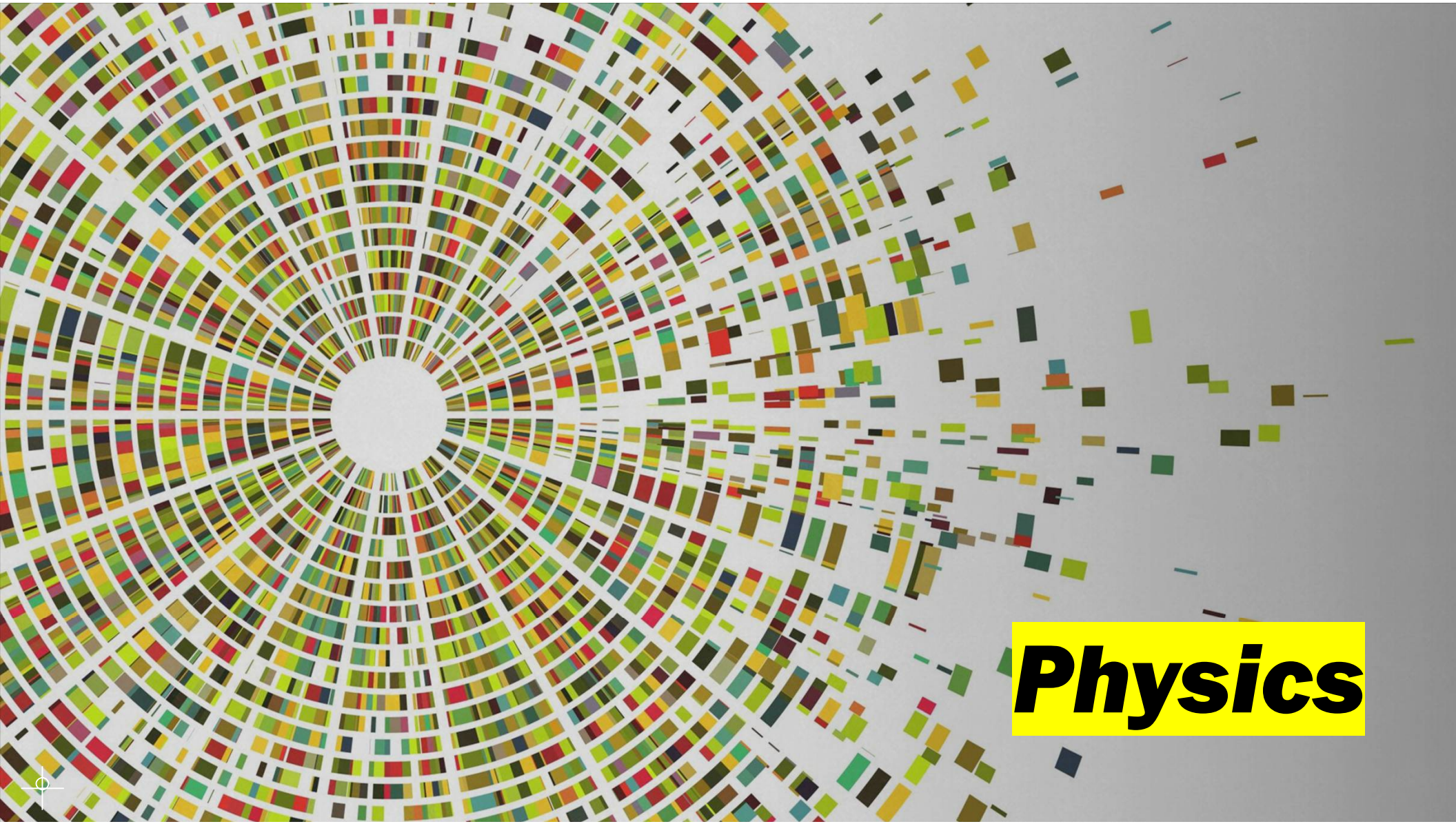

Physics

You should not take Physics

If, you take Physics because

- You don’t like other two sciences
- You do well for Physics portion in your End of Year Paper

Who should take Physics?

- If you are curious to understand how the world works. Physics is the basis for most of the modern technology.
- If you are not scared to do basic mathematics like multiplication, division, square root, and trigonometry (rarely).
- At a much higher level, Physics will come into picture even in Chemistry or Biology. So, for those planning ahead for university, you know what to do.

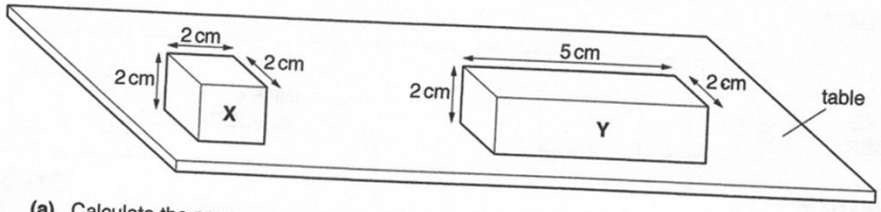
SAMPLE WORK (CALCULATION) G2 standard

Section A

Answer **all** the questions in the spaces provided.

1 Two blocks, **X** and **Y**, are resting on a table. The dimensions of the blocks are shown in centimetres, cm.

Each block weighs 0.5 N.



F / P | A

(a) Calculate the pressure exerted by block **X** on the table.

$P = \frac{0.5}{2 \times 2}$ $P = 0.125\ N/cm^2$

pressure exerted by block **X** = 0.125 N/cm^2 [1]

(b) Calculate the density of block **Y**.

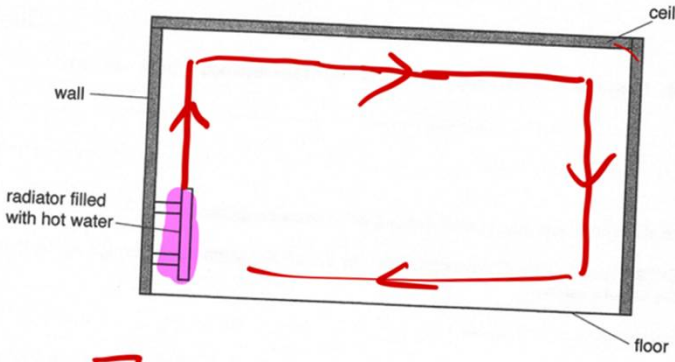
m / D | V

$m = \frac{W}{g} = \frac{0.5}{10}$ $m = 0.05kg = 50g$ $D = \frac{50}{2 \times 5 \times 2} = 2.5\ g/cm^3$

density of block **Y** = 2.5 g/cm^3 [2]

SAMPLE WORK (EXPLANATION) G2 Standard

4 The diagram shows a metal radiator fixed to the wall in a room. The radiator is filled with hot water.



(a) Name the main process by which heat travels through the metal of the radiator.

Conduction [1]

(b) Air in the room is heated by the radiator.

(i) Name the process by which this heated air eventually warms the rest of the room.

convection [1]

(ii) Explain how this process works. You can use the space inside the diagram of the room to help you answer the question.

P1: The air around the radiator is heated; it then expands, becomes less dense and rises.

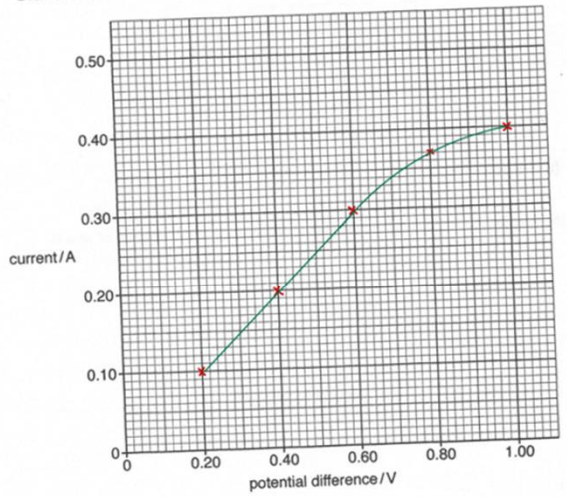
P2: The cooler, denser air at the top sinks to replace the heated air.

P3: This process repeated itself, forming a convection current. [2]

0.80	0.37
1.00	0.40

(i) Plot a graph of these results, marking each point with a cross (x).

Draw a best-fit line taking into account all the plotted points. [2]



(ii) For wire **V**, what can you conclude from the shape of your graph?

The p.d is not proportional to the current after 0.60V. This means that the resistance of wire V increases / not constant. [2]

$R = \frac{V}{I}$

SAMPLE WORK (LONGER EXPLANATION) G2 Standard

SAMPLE WORK (CALCULATION)

G3 standard

A bubble of gas rises from a diver to the surface of a lake, as shown in Fig. 12.3.

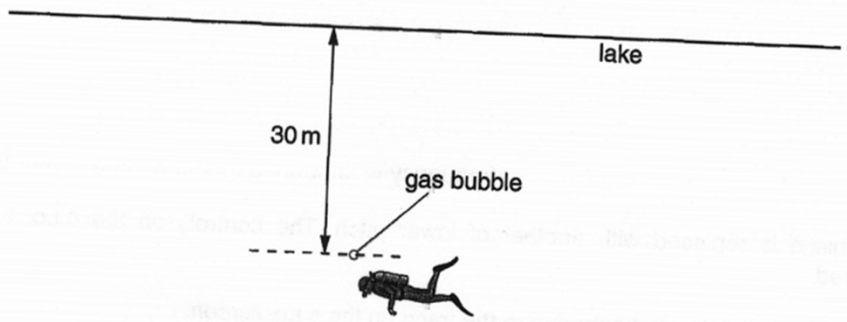


Fig. 12.3 (not to scale)

The bubble is 30 m below the surface of the lake.

(a) **(i)** The pressure of the atmosphere is 100 kPa and the density of the water is 1000 kg/m^3. The gravitational field strength g is 10 N/kg.

Calculate the pressure in the bubble at a depth of 30 m.

but ρ_{air} is not given! Wait $P_{in} = P_{out}$

$P_{water} = \rho g h$

$= 1000 \times 10 \times 30$

$P_{atm} = 100$ kPa

$P_{bubble} = 100{,}000 + 300{,}000$

$= 4.0 \times 10^5$ Pa

pressure = 400 kPa or 4.0×10^5 Pa [3]

SAMPLE WORK (EXPLANATION)

G3 Standard

(iii) Fig. 12.5 shows a miner below the surface of the Earth.

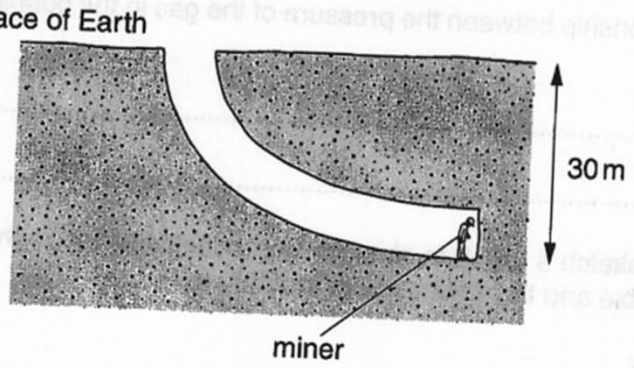


Fig. 12.5 (not to scale)

The atmospheric pressure 30 m below the surface of the Earth is almost the same as at the surface. The pressure in water at a depth of 30 m is very different from that at the surface.

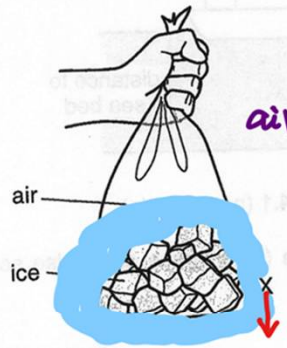
$P = \rho g h$ same for both. $\rho_{air} << \rho_{H_2O}$

Explain this.

Density of air is much lower than density of water. Thus, the same height of column of water will exert much greater pressure than that by air. [1]

3 Fig. 3.1 shows ice in a plastic bag being carried by a nurse from a freezer to the operating theatre in a hospital.

For Examiner's Use



air is cooled
↳ contracts ≠ expands
↳ more dense than ≠ less dense surrounding air
↳ sinks. ≠ rises

Fig. 3.1

(a) (i) The bag is held at rest and a convection current forms in the air outside the bag. On Fig. 3.1, draw an arrow to show the movement of the air at X close to the bag. [1]

(ii) Explain how the convection current is formed.

[P1] Air close to the bag gets cooled by the ice; it contracts/its volume decreases, becomes denser and sinks.
[P2] surrounding warmer air, being less dense, rise to be cooled by the ice in turn. The cycle repeats itself, forming a convection current. [2]

SAMPLE WORK

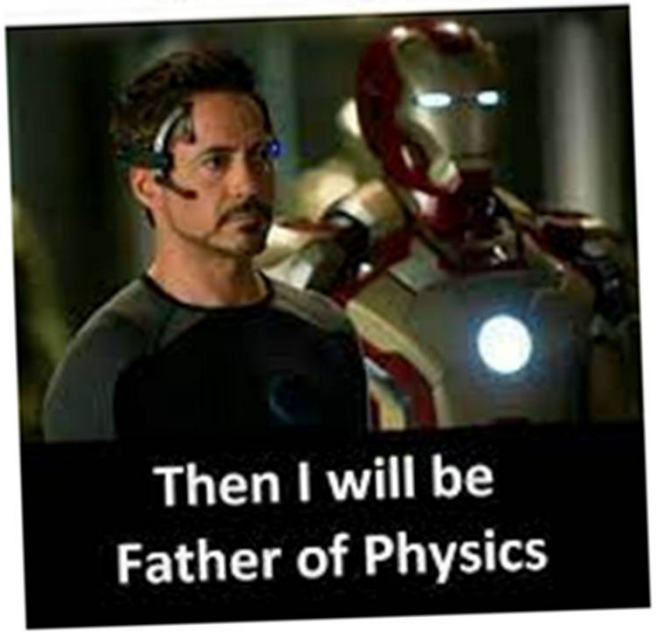
(LONGER EXPLANATION)

G3 Standard

DO YOUR HOMEWORK - it will be YOU who will have to go through with it

- Borrow a Physics textbook from your seniors and browse through the contents that you will be learning and see if that interests you in anyway.
- MAKE AN INFORMED DECISION - it’s your choice, so either you enjoy it, or you suffer through it.

I am going to name
my son Physics



Enjoy the meme