

Gas laws

1. A sample of unknown compound gas **X** is shown by analysis to contain Sulphur and Oxygen. The gas requires 28.3 seconds to diffuse through a small aperture into a vacuum. An identical number of oxygen molecules pass through the same aperture in 20seconds. Determine the molecular mass of gas X (O= 16, S= 32)

2. (a) State Graham's Law of diffusion

(b) Gas **V** takes 10 seconds to diffuse through a distance of one fifth of a meter. Another gas **W** takes the same time to diffuse through a distance of 10 cm. if the relative molecular mass of gas **V** is 16.0; calculate the molecular mass of **W**

3. (a) State Charles' Law

(b) The volume of a sample of nitrogen gas at a temperature of 291K and 1.0×10^5 Pascals was $3.5 \times 10^{-2} \text{m}^3$. Calculate the temperature at which the volume of the gas would be $2.8 \times 10^{-2} \text{m}^3$ at 1.0×10^5 pascals.

4. 60 cm³ of oxygen gas diffused through a porous partition in 50 seconds.
How long would it take
60 cm³ of sulphur (IV) oxide gas to diffuse through the same partition under
the same conditions?
(S = 32.0, O = 16.0)

5. (a) State Graham's law of diffusion

(b) 30cm³ of hydrogen chloride gas diffuses through a porous pot in
20seconds. How long
would it take 42cm³ of sulphur(IV) oxide gas to diffuse through the
same pot under
the same conditions (H =1 Cl = 35.5 S = 32 O =16)

6. a) State **Boyles law**

b) Sketch a graph that represents Charles' law

c) A gas occupied a volume of 250cm^3 at -23°C and 1 atmosphere.
Determine its volume
at 127°C when pressure is kept constant.

7. A factory produces Calcium Oxide from Calcium Carbonate as shown in the equation below:-



(a) What volume of Carbon (IV) Oxide would be produced from 1000kg of Calcium Carbonate at s.t.p (Ca = 40, C = 12, O = 16, Molar gas volume at s.t.p = 22.4dm^3)

8. A fixed mass of gas occupies 200cm^3 at a temperature of 23°C and pressure of 740mmHg.
Calculate the volume of the gas at -25°C and 780mmHg pressure

9. Gas **K** diffuses through a porous material at a rate of $12\text{cm}^3 \text{ s}^{-1}$ where as **S** diffuses through the same material at a rate of $7.5\text{cm}^3\text{s}^{-1}$. Given that the molar mass of **K** is 16, calculate the molar mass of **S**

10. (a) State Gay Lussac's law

. 11. (a) What is the relationship between the rate of diffusion of a gas and its molecular mass?

(b) A sample of Carbon (IV) Oxide takes 200 seconds to diffuse across a porous plug.

How long will it take the same amount of Carbon (II) Oxide to diffuse through the same plug?(C=12, O=16)