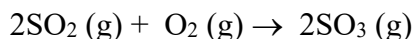


Gas Volumes Q

- 1 3.0 dm³ of sulfur dioxide are reacted with 2.0 dm³ of oxygen according to the equation:



What volume of sulfur trioxide (in dm³) is formed? (Assume the reaction goes to completion and all gases are measured at the same temperature and pressure.)

- A 5.0 B 4.0 C 3.0 D 2.0

- 2 $\text{H}_{2(\text{g})} + \text{Cl}_{2(\text{g})} \rightarrow 2\text{HCl}_{(\text{g})}$

Hydrogen and chlorine react according to the equation above. What will be the result of the reaction between 200 cm³ of H₂ and 150 cm³ of Cl₂? (all gas volumes measured at the same temperature and pressure)

- A 350 cm³ of HCl B 150 cm³ of HCl and 50 cm³ of H₂
 C 200 cm³ of HCl and 50 cm³ of Cl₂ D 300 cm³ of HCl and 50 cm³ of H₂

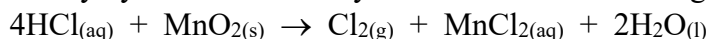
- 3 According to the equation: $2\text{SO}_{2(\text{g})} + \text{O}_{2(\text{g})} \rightarrow 2\text{SO}_{3(\text{g})}$
 what volume of air (20 % O₂) is required to react with 10 dm³ of SO₂?

- A 2 dm³ B 5 dm³ C 10 dm³ D 25 dm³

- 4 Equal **volumes** of oxygen and hydrogen are reacted in a closed container. After the reaction is complete, the container will contain

- A water and oxygen only B water and hydrogen only
 C water only D water, hydrogen and oxygen

- 5 Chlorine was first prepared by the reaction of hydrochloric acid with manganese(IV) oxide:



In a repetition of the original chlorine preparation, a solution of hydrochloric acid containing 14.6 g of hydrogen chloride reacted completely with manganese(IV) oxide.

- (a) Calculate how many moles of hydrogen chloride reacted. [1]

- (b) Calculate the volume of chlorine produced at 90KPa and 35^oC. [2]

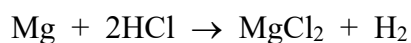
- 6 A 12.6 g sample of propene undergoes combustion: $2\text{C}_3\text{H}_{6(\text{g})} + 9\text{O}_{2(\text{g})} \rightarrow 6\text{CO}_{2(\text{g})} + 6\text{H}_2\text{O}_{(\text{l})}$

Calculate the volume of carbon dioxide that would be produced from this combustion at 100KPa pressure and 20^oC. [2]

Gas Volumes Q

- 7 A 1.20 dm³ sample of helium gas has a pressure of 4.67 x 10⁴ Pa at 300 K. What pressure will the sample exert if the volume is changed to 1.60 dm³ and the temperature is changed to 400 K?
A 4.67 x 10⁴ Pa B 3.47 x 10⁴ Pa C 2.63 x 10⁴ Pa D 8.27 x 10⁴ Pa
- 8 The temperature of 420 cm³ hydrogen gas is changed from 20.0 °C to -20 °C at constant pressure. What is the final volume?
A 363 cm³ B 392 cm³ C 406 cm³ D 486 cm³
- 9 2.00 mol of helium at a temperature of 27 °C and a pressure of 3.00 atm (304 kPa) may be contained in a vessel of what volume?
A 6.1 x 10⁻² dm³ B 1.48 dm³ C 4.48 dm³ D 16.4 dm³
- 10 A 0.365 g sample of a common anaesthetic has a volume of 225 cm³ at 35 °C and 98.6 kPa. What is its molar mass?
A 42.1 B 40.8 C 39.9 D 4.79
- 11 A certain gas has a density of 2.35 g dm⁻³ at 30 °C and 96 kPa (0.95 atm). The molar mass of this gas will be closest to which of the following?
A 50 B 60 C 70 D 80

- 12 Magnesium metal reacts with hydrogen gas according to the following equation:



When excess hydrochloric acid is reacted with magnesium 100 cm³ of hydrogen gas is collected at a temperature of 20 °C and a pressure of 1.08 x 10⁵ Pa.

- (a) Calculate the number of moles of hydrogen gas produced. [2]
- (b) Calculate the mass of magnesium that reacted. [2]
- 13 When manganese(IV) oxide (MnO₂) is heated strongly it decomposes:
- $$3\text{MnO}_2 \rightarrow \text{Mn}_3\text{O}_4 + \text{O}_2$$
- When 10.00 g of MnO₂ is heated what volume of oxygen (collected at 18 °C and 1.05 x 10⁵ Pa) is produced? [4]