

Section A:

1. What are the conditions of rtp?

Tick one box.

Room temperature (22°C) and 2 atm of pressure

Room temperature (22°C) and 1 atm of pressure

Room temperature (20°C) and 1 atm of pressure

2. What is the molar volume of a gas at rtp?

Tick one box.

20 dm^3

22 dm^3

24 dm^3

3. In the box below, write the equation that links number of moles, volume and molar volume.

4. State the two factors that must remain constant for 1 mole of two different gases to occupy the same volume.

Section B



Use a periodic table and show all working for the following questions:

5. Assuming rtp, calculate the volume of:
a. 2 mol of CO₂.

- b. 0.25 mol of ammonia (NH₃).

6. Assuming rtp, calculate the amount of substance present in:
a. 0.75 dm³ of steam.

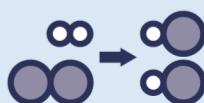
- b. 200 cm³ of hydrogen.

7. A scientist reacts hydrochloric acid with lithium hydroxide.

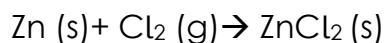
- a. Name the salt that would be formed in this reaction.

- b. Write a balanced symbol equation for this reaction.

- c. Describe a method that could be used to obtain crystals of the salt produced in this reaction.



- d. The scientist then makes zinc chloride by heating zinc in chlorine gas. The equation for the reaction is shown below:



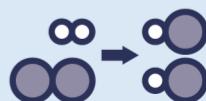
Calculate the volume of chlorine needed to react completely with 11 g of zinc.

8. Aluminium oxide can be electrolysed according to the following equation:



- a. Calculate the mass of aluminium that would be produced when 800 kg of aluminium is completely electrolysed.
-
-
-
-

- b. Calculate the volume of oxygen that would be produced when 800 kg of aluminium is completely electrolysed.
-
-
-
-

Section C

9. Avogadro's law states that equal volumes of gases, at the same temperature and pressure, have the same number of molecules.
- State molar volume at rtp.
 - Compare the movement of particles in a solid and in a gas.
 - Explain what causes gas pressure.
 - Describe and explain the relationship between temperature of a gas and pressure.
 - Describe and explain the relationship between volume of a gas and pressure.
 - 2 dm³ of oxygen gas at 27 Pa of pressure is compressed to a quarter of its original volume. Calculate the pressure at the new volume.

