

Gas Law Questions B

Partial Pressures

1. Air is a mixture of many gases. The partial pressure of nitrogen is 80 kPa and of oxygen is 20.3 kPa. If atmospheric pressure is 101.3 kPa, what is the pressure due to all the other gases in the atmosphere? [1 kPa]
2. A student collects 100 mL of oxygen over water at 21°C ($P_{\text{wv}} = 2.49$ kPa). If the atmospheric pressure is 100.7 kPa, what is the partial pressure of oxygen? [98.21 kPa]

Molar Volume and Density

3. What is the density of each of the following gases at SATP? N₂, CO₂, Ar, CH₄ [1.13, 1.77, 1.61, 0.65]
4. What is the molar mass of a gas if its density at SATP is a) 2.3 g/L, b) 0.89 g/L? [57.0, 22.1]

Ideal Gas Law

5. If 1 mol of a gas occupies 20.5 L at 26°C, what is the pressure of the gas? [121 kPa]
6. If a sample of a gas occupies 450 mL at 105 kPa and 25°C, how many moles of a gas are present in the sample? [0.019 mol]
7. If 1.57 g of N₂ occupy 350 mL at 27°C, what is the pressure of the gas? [399 kPa]
8. Calculate the volume occupied by half a mole of carbon dioxide gas at 33.0 kPa and -35°C. [30.0 L]
9. If a sample of sulfur dioxide occupies 325 mL at 102 kPa and 50°C, how many grams of sulfur dioxide are present in the sample? [0.79]
10. If 0.150 mol of gas are collected at 105 kPa and 22°C, what is the volume of the gas? [3.5 L]
11. What is the temperature of 1.10 g of CO₂ that occupies 600 mL at 99.0 kPa? [286K]
12. How many moles will be present if there are 45 L of the gas at a pressure of 102.3 kPa and a temperature of 245K? [2.26 mol]
13. If 1.74 g of a volatile liquid is vapourized and occupies 224 mL at SATP, what is the molar mass of the compound? [192 g/mol]
14. If 2.38 g of a gas occupies 448 mL at a pressure of 100 kPa and a temperature of 14°C, what is the molar mass of the compound? [126.7 g/mol]
15. If 23.1 g of a gas occupies a volume of 19.8 L at a temperature of 25°C and a pressure of 104 kPa, what will the mass of 24.8 L of the gas be at SATP? [27.78 g]
16. A researcher found that when she collected 45.3 g of a certain gas at a temperature of 20°C and a pressure of 91.5 kPa, the gas had a volume of 38.0 L. What would the mass of 22.4 L of the gas be at STP? [31.72g]
17. How many grams of O₂ would be present in 650 mL at 98 kPa and 24°C? [0.82 g]
18. How many grams of carbon would have to be burned to produce 500 mL of carbon dioxide collected at 100 kPa and 27°C? [0.24 g]

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