

Problem of the Day 4 CHEM 1252

1. A sample of nitrogen dioxide has a volume of 28.6 L at 45.3°C and 674 torr. What is its volume (in L) at STP?

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2. A 23.5 mL volume of hydrochloric acid reacts completely with a solid sample of magnesium carbonate to produce carbon dioxide, water, and aqueous magnesium chloride. The volume of carbon dioxide formed is 154 mL at 23°C and 731 mmHg.

(a) Write a balanced chemical equation for this reaction.

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(b) What is the molarity of the HCl solution?

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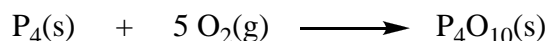
3. N_2O and NO are often known by the common names nitrous oxide and nitric oxide. You are going to figure out which common name belongs to which molecular formula using the following data. Nitric oxide diffuses through a pinhole 1.21 times as fast as nitrous oxide. You must justify your answer.

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4. It takes 6.5 s for 25.0 cm^3 of helium gas to effuse through a pinhole. How long would it take for 25.0 cm^3 of CH_4 to escape under the same conditions?

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5. Questions 5(a) and (b) apply to the following reaction.



(a) How many moles of O_2 are present in 35.5 L of O_2 at STP?

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(b) How many grams of P_4 react with the amount of oxygen calculated in part (a)?

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6. A piece of dry ice, solid CO_2 , weighing 10.0 g is placed in an evacuated 0.800 L bottle at 550. $^\circ\text{C}$. The bottle is capped, and the dry ice changes to a gas. What is the final pressure inside the bottle.

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