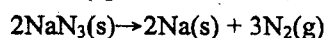


1. Sodium azide (NaN_3) is used in some automobile air bags. The impact of a collision triggers the decomposition of NaN_3 as follows:



The nitrogen gas produced quickly inflates the bag between the driver and the windshield. Calculate the volume of N_2 generated at 80°C and 823 mmHg by the decomposition of 60.0 g of NaN_3 . (Na: 23, N: 14) (10%)

2. Write chemical formulas or inorganic cations for these compounds: (a) mercury (I) nitrite (b) cesium sulfide (c) calcium phosphate (d) Aluminum (e) Calcium (f) ferrous (g) cadmium (h) Ammonium (i) sodium (j) silver (20%)

3. Find the pH of 0.1M ammonium. (K_a for ammonium ion is 5.7×10^{-10} , $\log 7.61 = 0.88$) (20%)

4. The pH of a 0.1 M benzoic acid ($\text{C}_6\text{H}_5\text{COOH}$) solution is 2.6. What is the K_a of the acid? (10%)

5. Describe how you would prepare 5×10^2 mL of 1.75 M H_2SO_4 solution, starting with 8.61 M stock solution of H_2SO_4 . (20%)

6. Classify these ionic compounds as soluble or insoluble: (a) silver sulfate (b) calcium carbonate (c) sodium phosphate (d) CuS (e) $\text{Ca}(\text{OH})_2$ (e) $\text{Zn}(\text{NO}_3)_2$ (10%)

7. Write formal charges for the carbonate ion (10%)

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