Using a #2 pencil, darken the balloon on the answer sheet corresponding to the best answer.

81. What salt is produced in the reaction of hydrobromic acid with calcium hydroxide?
   a. NaBr
   b. CaBr₂
   c. Ca(NO₃)₂
   d. NaBr
   e. CaSO₄

82. What is the pH of a solution if \([H^+] = 1 \times 10^{-4}\)?
   a. 1 \times 10^{-4}
   b. 1
   c. 6
   d. 8
   e. 14

83. The formate ion is \(\text{HCO}_2^-\). What is the conjugate acid of the formate ion?
   a. \(\text{CO}_2^+\)
   b. \(\text{H}_2\text{CO}_2^-\)
   c. \(\text{H}_2\text{CO}_3\)
   d. \(\text{H}_2\text{CO}_3\)
   e. NaOH

84. Which has exactly 24 neutrons in its nucleus?
   a. neon-24
   b. sodium-24
   c. \(^{52}\text{Cr}\)
   d. \(^{24}\text{Mg}\)
   e. \(^{44}\text{Ca}\)

85. Which is capable of dipole-dipole and hydrogen-bonding interactions?
   a. HBr
   b. CO₂
   c. \(\text{CH}_3\text{CH}_2\text{Cl}\)
   d. NH₃
   e. \(\text{CH}_4\)

86. The following balanced reaction occurs at constant temperature and pressure.

\[
2\text{N}_2(g) + 3\text{O}_2(g) \rightarrow 2\text{N}_2\text{O}_3(g)
\]

If 3 L of nitrogen gas are used in this reaction, how many liters of product will form?
   a. 2 L
   b. 4 L
   c. 6 L
   d. 8 L
   e. 12 L

87. What is the concentration if 0.90 grams of a toxic contaminant are present in 60.0 kilograms of contaminated river water?
   a. 0.15% (w/w)
   b. 1.5% (w/w)
   c. 0.15 ppm
   d. 1.5 ppm
   e. 15 ppm

\[
\frac{0.90g}{60,000g} \times 10^6 = 15 \text{ ppm}
\]
81. What salt is produced in the reaction of sulfuric acid with calcium hydroxide?
   a. Ca(NO₃)₂  d. Na₂SO₄
   b. CaCl₂  e. NaCl
   c. CaSO₄

82. What is the pH in a solution if [H⁺] = 1 x 10⁻⁹?
   a. 1  d. 9
   b. 3  e. 1 x 10⁻⁹
   c. 5

83. What is the conjugate base of HCN?
   a. OH⁻  d. HCNO⁻
   b. H₂O⁻  e. CNO⁻
   c. HCN⁻

84. Which has exactly 20 protons in its nucleus?
   a. calcium-44  d. ²⁰F
   b. neon-20  e. ³⁹K
   c. cadmium

85. Which is capable of dipole-dipole interactions?
   a. CS₂  d. GaCl₃
   b. BF₃  e. all of the above
   c. PH₃

86. How much CO₂ would be formed if 6 L of CO gas react completely in this reaction?
   \( \text{2 CO (g) + O₂ (g) \rightarrow 2 CO₂ (g)} \)
   a. 2 L  b. 3 L  c. 5 L  d. 12 L  e. 16 L

87. What mass of RbBr (RbBr, 165.4 g/mol) would be needed to prepare 300 mL of 0.800 M RbBr solution?
   a. 132 g  b. 39.7 g  c. 441 g  d. 49.6 g  e. 62.0 g

\( (0.300 \text{L})(0.800 \text{mol/L RbBr})(\frac{165.4 \text{g RbBr}}{\text{mol}}) = 39.7 \text{g} \)
81. What salt is produced in the reaction of barium hydroxide with nitric acid?
   a. BaSO₄  
   b. NaCl  
   c. NaNO₂  
   d. BaCl₂  
   e. Ba(NO₃)₂  

82. What is the pH in a solution if [H⁺] = 1 × 10⁻¹¹?
   a. 1  
   b. 3  
   c. 11  
   d. 14  
   e. 1 × 10⁻¹¹  

83. Hypobromous acid is HOBr. What is its conjugate base?
   a. OBr⁻  
   b. HOBr⁻  
   c. H₂OBr⁻  
   d. H₂OBr  
   e. NaOH  

84. How many protons and neutrons are in the nucleus of an atom of silicon-30?
   a. 15p 15n  
   b. 12p 18n  
   c. 14p 30n  
   d. 14p 16n  

85. Which is (are) capable of dipole–dipole interactions, but can’t H-bond?
   a. CO₂  
   b. SO₂  
   c. H–C=N  
   d. b and c  
   e. all of the above  

86. How much water would be formed if 6.0 L of hydrogen gas are used in this reaction?
   O₂(g) + 2 H₂(g) → 2 H₂O(g)  
   a. 2.0 L  
   b. 3.0 L  
   c. 6.0 L  
   d. 8.0 L  
   e. 12 L  

87. What is the concentration if 6.0 grams of a toxic contaminant are present in 800.0 kilograms of contaminated river water?
   a. 0.75 ppm  
   b. 1.5 ppm  
   c. 75 ppm  
   d. 0.075 w/w%  
   e. 0.75 w/w%  
   \[
   \frac{6.0 \text{ g}}{800,000 \text{ g}} \times 10^6 = 7.5 \text{ ppm}
   \]