

**AP MULTIPLE CHOICE QUESTIONS**  
**CH. 16, SET 1**

**1984**

33. The pH of 0.1-molar ammonia is approximately  
 (A) 1 (D) 11  
 (B) 4 (E) 14  
 (C) 7
48. Which of the following ions is the strongest Lewis acid?  
 (A)  $\text{Na}^+$  (D)  $\text{Mg}^{2+}$   
 (B)  $\text{Cl}^-$  (E)  $\text{Al}^{3+}$   
 (C)  $\text{CH}_3\text{COO}^-$
49. Each of the following can act as both a Bronsted acid and a Bronsted base EXCEPT  
 (A)  $\text{HCO}_3^-$  (D)  $\text{H}_2\text{O}$   
 (B)  $\text{H}_2\text{PO}_4^-$  (E)  $\text{HS}^-$   
 (C)  $\text{NH}_4^+$
71. Which of the following reactions does NOT proceed significantly to the right in aqueous solutions?  
 (A)  $\text{H}_3\text{O}^+ + \text{OH}^- \rightarrow 2\text{H}_2\text{O}$   
 (B)  $\text{HCN} + \text{OH}^- \rightarrow \text{H}_2\text{O} + \text{CN}^-$   
 (C)  $\text{Cu}(\text{H}_2\text{O})_4^{2+} + 4\text{NH}_3 \rightarrow \text{Cu}(\text{NH}_3)_4^{2+} + 4\text{H}_2\text{O}$   
 (D)  $\text{H}_2\text{SO}_4 + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ + \text{HSO}_4^-$   
 (E)  $\text{H}_2\text{O} + \text{HSO}_4^- \rightarrow \text{H}_2\text{SO}_4 + \text{OH}^-$
75. If the acid dissociation constant,  $K_a$ , for an acid HA is  $8 \times 10^{-4}$  at  $25^\circ\text{C}$ , what percent of the acid is dissociated in a 0.50 molar solution of HA at  $25^\circ\text{C}$ ?  
 (A) 0.08% (D) 2%  
 (B) 0.2% (E) 4%  
 (C) 1%
37.  $\_\_\text{CH}_3\text{CH}_2\text{COOH} + \_\_\text{O}_2 \rightarrow \_\_\text{CO}_2 + \_\_\text{H}_2\text{O}$   
 How many moles of  $\text{O}_2$  are required to oxidize 1 mole of  $\text{CH}_3\text{CH}_2\text{COOH}$  according to the reaction represented above?  
 (A) 2 moles (D)  $7/2$  moles  
 (B)  $5/2$  moles (E)  $9/2$  moles  
 (C) 3 moles
43. Which of the following does NOT behave as an electrolyte when it is dissolved in water?  
 (A)  $\text{CH}_3\text{OH}$  (D) HI  
 (B)  $\text{K}_2\text{CO}_3$  (E) sodium acetate  
 (C)  $\text{NH}_4\text{Br}$   $\text{CH}_3\text{COONa}$
46. As the number of oxygen atoms increases in any series of oxygen acids, such as  $\text{HXO}$ ,  $\text{HXO}_2$ ,  $\text{HXO}_3$ , ..., which of the following is generally true?  
 (A) The acid strength varies unpredictably.  
 (B) The acid strength decreases only if X is a non-metal.  
 (C) The acid strength decreases only if X is a metal.  
 (D) The acid strength decreases whether X is a metal or nonmetal.  
 (E) The acid strength increases.

**1989**

15. The weight of  $\text{H}_2\text{SO}_4$  (molecular weight 98.1) in 50.0 mL of a 6.00-molar solution is  
 (A) 3.10 grams (D) 294 grams  
 (B) 12.0 grams (E) 300. grams  
 (C) 29.4 grams
34. All of the following species can function as Bronsted-Lowry bases in solution EXCEPT  
 (A)  $\text{H}_2\text{O}$  (D)  $\text{NH}_4^+$   
 (B)  $\text{NH}_3$  (E)  $\text{HCO}_3^-$   
 (C)  $\text{S}^{2-}$