Nan	ne: CHEMIST	RY	<u> HW 09 - ACIDS & BAS</u>	<u>ES</u>	
1)	A water solution that has an H^+ ion concentration of 1 x 10 ⁻⁸ mole per liter is classified as		8) Which substance, when dissolved in water, is a Br Lowry acid?		
	A) basic, with a pH greater than 7		A) NaOH	C)	CH ₃ OH
	B) acidic, with a pH less than 7		B) C ₂ H ₅ COOH	D)	CH ₃ COO-
	C) acidic, with a pH greater than 7D) basic, with a pH less than 7		Which type of reaction is represented by the following equation?		
2)	In the reaction $H_2SO_4 + H_2O \& \tilde{S} \le H_3O^+ + HSO_4^-$, which two are proton donors?		$Al_2S_3 + 6H_2O \ddagger \ddagger 2Al(OH)_3 + 3H_2S$		
	A) H_2SO_4 and H_3O^+ C) H_2O and H_3O^+		A) electrolysis	C)	hydrolysis
	B) H ₂ SO ₄ and HSO ₄ ⁻ D) H ₂ O and HSO ₄ ⁻	10	B) dehydration	D)	neutralization
3)	Which is a net ionic equation for a neutralization reaction? A) $NH_4^+ + OH^- \ddagger \uparrow^NH_4OH$		Which compounds are <i>both</i> classified as electrolytes?		
			R) Γ_{4} Γ_{10}		
	B) $H^+ + HCO_3^- \ddagger \ddagger^2 H_2CO_3$		C) NH4Cl and C6H12O6		
	C) $Ag^+ + Cl^- \ddagger \ddagger^{-} AgCl$				
	D) $H^+ + OH^- \ddagger \ddagger^{-} H_2O$	11)	According to the Arrhenius	theory, a	substance that is
4)	What color is phenolphthalein in a solution that has a pH of 9^{2}		classified as an acid will <i>alwa</i> A) $H^+(aq)$	ays yield	$CO_2^{2-}(aq)$
	A) colorless C) pink		$B) OH^{-}(aq)$	D)	$NH_4^+(aq)$
	B) white D) blue	12)	According to the Bronsted I	ours the	orry on acid is
5)	Which equation represents a neutralization reaction?		A) an electron acceptor	owry the	ory, all actu is
	A) NaCl(aq) + AgNO ₃ (aq) $\ddagger \uparrow$ NaNO ₃ (aq) + AgCl(s)		B) an electron donor		
	B) $Ag^+(aq) + I^-(aq) \ddagger \uparrow^A gI(s)$		C) a proton donor		
	C) $H^+(aq) + OH^-(aq) \ddagger \uparrow^{-} H_2O(l)$		D) a proton acceptorB) Given the reaction at equilibrium:		
	D) $Zn(s) + 2HCl(aq) \ddagger \uparrow ZnCl_2(aq) + H_2(g)$	13)			
6)	Given the reaction at equilibrium: $NH_4^+ + OH^- \% \breve{S} \breve{S} < H_2O + NH_3$		$HSO_4^- + H_2O \% \breve{S}\breve{S} < H_3O^+ + SO_4^{2-}$		
			The two Bronsted bases are		
	Which species is the Bronsted-Lowry acid in the forward reaction?		A) H ₂ O and SO ₄ ²⁻	C)	H ₂ O and H ₃ O ⁺
			B) H_3O^+ and SO_4^{2-}	D)	H ₃ O ⁺ and HSO ₄ -
	A) OH- C) H ₂ O	14)	Which solution will change r	red litmus	s to blue?
	B) NH ₄ ⁺ D) NH ₃		A) HCl(aq)	C)	NaCl(aq)
7)	Given the reactions:		B) CH ₃ OH(aq)	D)	NaOH(aq)
	(A) $NH_3(g) + H_2O(l) \ddagger \uparrow NH_4^+(aq) + OH^-(aq)$	15) According to the Arrhenius theory, the acidic proper an aqueous solution is due to an excess of		he acidic property of ess of	
	(B) $HCl(aq) + H_2O(l) \ddagger \uparrow H_3O^+(aq) + Cl^-(aq)$		A) OH-	C)	H ₂ O

B) H⁺

D) H₂

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(**B**) $HCl(aq) + H_2O(l) \ddagger \ddagger H_3O^+(aq) + Cl^-(aq)$

As shown in equations (A) and (B) and based on the Bronsted theory, water is an amphoteric substance because it can

- A) neither donate nor accept protons
- B) either donate or accept protons
- C) donate protons, only
- D) accept protons, only

16)	Given the equation: H2O + HF $\%$ ŠŠ $<$ H2O ⁺ + F ⁻		25)	What is the molarity of a KOH solution if it requires 20. milliliters of 2.0 M HCl to exactly neutralize 20. milliliters of the KOH solution?		
				A) 2.0 M	C) 20. M	
	Which pair represents Bronsted-Lowry acids?			B) 10. M	D) 1.0 M	
	A) HF and H_3O^+ C) H_2O and H_3O^+		nd H ₃ O ⁺ 26)	Which formulas represent a conjugate acid-base pair?		
	B) H ₂ O and F ⁻	D) HF and	i F-	A) H_2SO_4 and SO_4^{2-}		
17)	Which solution will change litmus paper red?		,	B) H ₃ O ⁺ and OH ⁻		
	A) NaOH(aq) C) CH ₃ COOH(aq)		DOH(aq)	C) CH ₃ COOH and CH	3COO-	
	B) NH ₄ OH(aq)	D) CH ₃ O	D-(aq)	D) H ₃ PO ₄ and PO ₄ ³⁻		
18)	In the solution, litmus is blue. The pH of the solution could be		solution could 27)	In the reaction H ₂ O + C Bronsted-Lowry acids a	O3 ²⁻ ‰ŠŠ< OH ⁻ + HCO3 ⁻ , the two re	
	A) 4	C) 10		A) CO_3^{2-} and OH^{-}	C) CO_3^{2-} and HCO_3^{-}	
	B) 2	D) 3		B) H ₂ O and OH ⁻	D) H ₂ O and HCO ₃ $-$	
19)	Which concentration indicates a basic solution at 298 K?		on at 298 K?		1 - 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0	
	A) $[H_3O^+] = 1.0 \times 10^{-7}$ B) $[H_3O^+] > 1.0 \times 10^{-7}$ C) $[OH^-] > 1.0 \times 10^{-7}$ D) $[OH^-] = 1.0 \times 10^{-7}$		20)	28) In the reaction $H_2O + H_2O + H_3O' + OH$, the wa		
				A) neither a proton acceptor nor donor		
				B) a proton donor, only		
•••				C) a proton acceptor, o	only nter and denor	
20)	Water containing dissolved electrolyte conducts electricity because the solution contains mobile		ucts electricity	b) both a proton acceptor and donor		
	A) ions	C) atoms	29)	of 1.0×10^{-8} mole per li	ter has a pH of	
	B) electrons	D) molect	iles	A) 6, which is acidic	C) 8, which is basic	
21)	Which type of reaction will occur when volumes of 0.1 M HCl and 0.1 M NaOH are mixed?		mes of 0.1 M	B) 8, which is acidicWhich is a characteristic	D) 6, which is basic c of a solution of HNOc?	
	A) hydrolosis	C) neutra	lization	A) It turns litmus blue	e of a solution of filled 3.	
	B) electrolysis	D) ionizat	ion	B) It conducts electric	ity.	
22)	Given the reaction:			C) It turns phenolphth	alein pink	
	$HF + H_2O \% \tilde{S} < F^- + H_3O^+$			D) It forms OH ⁻ ions.	·· · · · · · · · · · · · · · · · · · ·	
				which compound reacts with an acid to form a salt and water?		
	Which species is the Brons	ted acid in the rev C Hao	verse reaction?	A) KOH	C) CH ₃ COOH	
	A) III ⁻ D) E-	C) H_2O^+		B) CH ₃ Cl	D) KCl	
23)	 B) F⁻ D) H₃O⁺ According to the Arrhenius theory, when an acid substance is dissolved in water it will produce a solution containing only one kind of positive ion. To which ion does the theory refer? 		acid substance 32) n containing	One sample of a solutio phenolphthalein and an	n with a pH of 10 is tested with other sample of this solution is	
			loes the theory	 A) blue and the phenolphthalein is colorless B) red and the phenolphthalein is pink 		
	A) sodium	C) hydrog	gen	C) red and the phenolphthalein is colorless		
	B) chloride	D) acetate	2	D) blue and the pheno	lphthalein is pink	
24)	Given the reaction:		33)) The reaction of NH ₄ NO	3 with water to form an acidic	
	$KOH + HNO_3 \ddagger \ddagger^{KNO_3} + H_2O$			solution is called		
				A) reductionB) hydrolysis	C) oxidation D) electrolysis	
	A) neutralization	C) esterif	ication		2, 100000,000	
	··· ··································	C) Coterin				

B) substitution

D) addition

34) As HF dissolves in water, the following ionization reaction occurs:

 $HF + H_2O \% \breve{S} \breve{S} < H_3O^+ + F^-$

In this reaction, a proton is donated to

A) H_2O by HF C) H_3O^+ by F-

B)	$H_{3}O^{+}$ by $H_{2}O$	D) HF by F-
	5 7 2	,

35) What is the total number of moles of H⁺ ions that will neutralize 2.0 moles of OH⁻ ions?

A)	17	C)	2.0
B)	34	D)	1.0

36) In a titration, the endpoint of a neutralization reaction was reached when 37.6 milliliters of an HCl solution was added to 17.3 milliliters of a 0.250 M NaOH solution. What was the molarity of the HCl solution?

A)	0.250 M	C)	0.203 M
B)	0.543 M	D)	0.115 M

- 37) According to the Arrhenius theory, when a base is dissolved in water it will produce a solution containing only one kind of negative ion. To which ion does the theory refer?
 A) hydronium
 B) hydride
 C) hydroxide
 D) hydrogen
- 38) If 50. milliliters of 0.50 M HCl is used to completely neutralize 25 milliliters of KOH solution, what is the molarity of the base?
 - A) 1.0 MC) 0.50 MB) 2.5 MD) 0.25 M
- 39) What are the two Bronsted acids in the reaction below?

 $HPO_4^{2-} + H_2O \% \breve{S} \breve{S} < PO_4^{3-} + H_3O^+$

- A) HPO_4^{2-} and PO_4^{3-} C) H_2O and PO_4^{3-}
- B) HPO_4^{2-} and H_3O^+ D) H_2O and H_3O^+
- 40) What is the H⁺ ion concentration of a solution that has an OH⁻ ion concentration of 1×10^{-6} mole per liter at 25DC?
 - A) 1 x 10⁻¹⁴ M
 B) 1 x 10⁻¹⁰ M
 C) 1 x 10⁻⁶ M
 D) 1 x 10⁻⁸ M