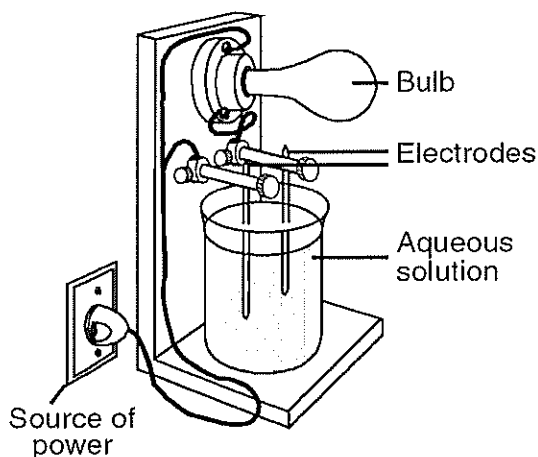


Acids & Bases Review Packet

Name: _____

- ___ 1) Which compounds are *both* classified as electrolytes?
- A) NH_4Cl and $\text{C}_6\text{H}_{12}\text{O}_6$ C) KCl and CH_3OH
B) NH_4Cl and KCl D) $\text{C}_6\text{H}_{12}\text{O}_6$ and CH_3OH
- ___ 2) Which of the following is a characteristic of a solution of HNO_3 ?
- A) It forms OH^- ions. C) It conducts electricity.
B) It turns phenolphthalein pink D) It turns litmus blue.
- ___ 3) The diagram below shows an apparatus used to test the conductivity of various materials.



Which aqueous solution will cause the bulb to light?

- A) $\text{CH}_3\text{OH}(\text{aq})$ C) $\text{C}_6\text{H}_{12}\text{O}_6(\text{aq})$
B) $\text{LiOH}(\text{aq})$ D) $\text{C}_{12}\text{H}_{22}\text{O}_{11}(\text{aq})$

- ___ 33) Which solution will change litmus paper red?
 A) $\text{CH}_3\text{COOH}(\text{aq})$ C) $\text{NH}_4\text{OH}(\text{aq})$
 B) $\text{CH}_3\text{COO}^-(\text{aq})$ D) $\text{NaOH}(\text{aq})$
- ___ 34) One sample of a solution with a pH of 10 is tested with phenolphthalein and another sample of this solution is tested with litmus. In this solution the color of the litmus is
 A) blue and the phenolphthalein is colorless
 B) blue and the phenolphthalein is pink
 C) red and the phenolphthalein is pink
 D) red and the phenolphthalein is colorless
- ___ 35) The table below shows the color of an indicator in specific pH ranges.

Color	pH Range
Red	1-4
Orange	5-6
Green	6-7
Blue	8-10
Violet	11-14

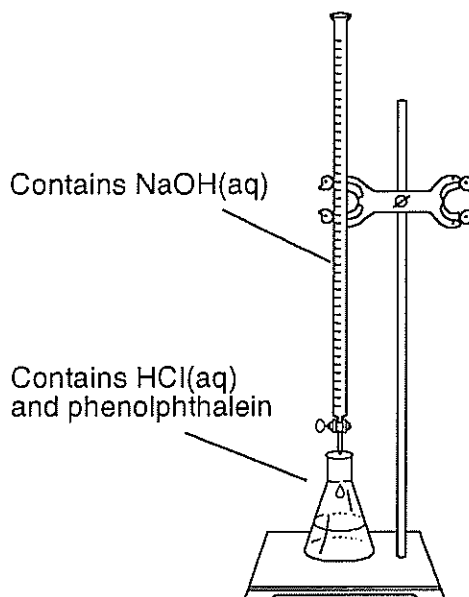
If this indicator is used when titrating an unknown strong base by adding a strong acid, the color of the indicator will change from

- A) green to blue C) green to orange
 B) blue to green D) orange to green
- ___ 36) Which indicators would cause a sodium hydroxide solution with a pH of 10.0 to turn blue?
 A) litmus and phenolphthalein C) litmus and methyl orange
 B) thymol blue and litmus D) thymol blue and methyl orange
- ___ 37) What is the pH of a solution that changes *both* methyl orange and litmus indicators red?
 A) 6 B) 2 C) 8 D) 4
- ___ 38) Which equation represents a neutralization reaction?
 A) $\text{AgNO}_3 + \text{NaCl} \longrightarrow \text{AgCl} + \text{NaNO}_3$
 B) $\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$
 C) $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$
 D) $2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{H}_2$

- ___ 39) What products are formed when an acid reacts with a base?
- A) a salt and water
B) an alcohol and carbon dioxide
C) an ester and water
D) a soap and glycerine
- ___ 40) Which compound is a salt?
- A) Na_3PO_4
B) H_3PO_4
C) CH_3COOH
D) $\text{Ca}(\text{OH})_2$
- ___ 41) 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) 0.50 M
B) 2.5 M
C) 1.0 M
D) 0.25 M
- ___ 42) 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) 1.0 M
B) 2.0 M
C) 10. M
D) 20. M
- ___ 43) If 20. milliliters of 2.0 M KOH is exactly neutralized by 10. milliliters of HCl, the molarity of the HCl is
- A) 1.0 M
B) 2.0 M
C) 3.0 M
D) 4.0 M
- ___ 44) If 20. milliliters of 1.0 M HCl was used to completely neutralize 40. milliliters of an NaOH solution, what was the molarity of the NaOH solution?
- A) 0.50 M
B) 2.0 M
C) 1.5 M
D) 4.0 M
- ___ 45) Which salt hydrolyzes in water to form a solution that is acidic?
- A) NaCl
B) LiCl
C) KCl
D) NH_4Cl
- ___ 46) When the salt Na_2CO_3 undergoes hydrolysis, the resulting solution will be
- A) acidic with a pH greater than 7
B) basic with a pH greater than 7
C) basic with a pH less than 7
D) acidic with a pH less than 7
- ___ 47) Which 0.1 M solution has a pH *closest* to 7?
- A) $\text{NaOH}(\text{aq})$
B) $\text{NaCl}(\text{aq})$
C) $\text{Na}_2\text{CO}_3(\text{aq})$
D) $\text{NaC}_2\text{H}_3\text{O}_2(\text{aq})$

- ___ 48) In the laboratory, a student neutralized 1.5 M HNO_3 with 0.50 M KOH .
- (a) Write the balanced equation for the reaction between HNO_3 and KOH .
- (b) How many milliliters of 0.50 M KOH are needed to exactly neutralize 10. milliliters of 1.5 M HNO_3 ? [*Write the correct formula. Show all work. Indicate the correct answer with an appropriate unit.*]
- ___ 49) In the laboratory, a student titrated HNO_3 with 0.50 M LiOH until the indicator changed from colorless to pink.
- (a) Write the balanced equation for the reaction between HNO_3 and LiOH .
- (b) If 50. milliliters of 0.50 M LiOH is required to exactly neutralize 100. milliliters of an HNO_3 solution, what is the molarity of the HNO_3 solution? [*Write the correct formula. Show all work. Indicate the correct answer with an appropriate unit.*]
- (c) What indicator was used in the titration?

- ___ 50) In the laboratory, a student performed an acid-base titration. The diagram below shows NaOH(aq) being added to HCl(aq).



The following data was collected:

Volume of the acid, HCl = 20.0 mL
Molarity of the acid = 0.50 M
Volume of the base, NaOH = 40.0 mL

- Write the balanced equation for the reaction between HCl and NaOH.
- Based on the data above, calculate the molarity of the NaOH. [*Write the correct formula. Show all work. Indicate the correct answer with an appropriate unit.*]
- What color does the indicator appear at the endpoint of the titration?
- What name is given to the reaction between equivalent quantities of an acid and a base?

- 1) B
- 2) C
- 3) B
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) B
- 10) A
- 11) D
- 12) D
- 13) D
- 14) B
- 15) C
- 16) A
- 17) B
- 18) D
- 19) A
- 20) C

- 21) B
- 22) C
- 23) A
- 24) B
- 25) A
- 26) B
- 27) C
- 28) B
- 29) C
- 30) A
- 31) C
- 32) A
- 33) A
- 34) B
- 35) B
- 36) B
- 37) B
- 38) C
- 39) A
- 40) A

41) C

42) B

43) D

44) A

45) D

46) B

47) B

48) (a) $\text{HNO}_3 + \text{KOH} \longrightarrow \text{KNO}_3 + \text{H}_2\text{O}$;

(b) 30. mL

WORK SHOWN: $M_A V_A = M_B V_B$, $(1.5 \text{ M})(10. \text{ mL}) = (0.50 \text{ M})(V_B)$, $V_B = 30. \text{ mL}$ 49) (a) $\text{HNO}_3 + \text{LiOH} \longrightarrow \text{LiNO}_3 + \text{H}_2\text{O}$;

(b) 0.25 M

WORK SHOWN: $M_A V_A = M_B V_B$, $(M_A)(100. \text{ mL}) = (0.50 \text{ M})(50. \text{ mL})$, $M_A = 0.25 \text{ M}$;

(c) phenolphthalein

50) (a) $\text{HCl} + \text{NaOH} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$;

(b) 0.25 M

WORK SHOWN: $M_A V_A = M_B V_B$, $(0.50 \text{ M})(20.0 \text{ mL}) = (M_B)(40.0 \text{ mL})$, $M_B = 0.25 \text{ M}$;

(c) pink;

(d) neutralization