Name: Answers Date: _____

BCI SCIENCE

SNC 2D

Chemistry Review II

A. Fill in the blanks (use the following list)

catalyst	ionization	acid	base	neutralization
indicator	electrolyte	rate	pH	concentration

1. A(n) acid is a substance that when dissolved in water ionizes to form H^+ ions and anions.
2. The pH scale is used to determine the degree of acidity or alkalinity.
3. The amount of pure acid or base per 1 L of water is the definition of concentration
4. When an ionic substance is dissolved in water it undergoes the process of ionization.
5. A(n) base is a substance that when dissolved in water ionizes to form cations and OH^- ions.
6. An aqueous solution that is capable of conducting electricity is known as a(n) electrolyte.
7. A substance that speeds up chemical reactions is called a catalyst.
8. The speed at which a reaction occurs is the rate of reaction.
9. A(n) indicator is a substance that changes colour at a specific pH range.
10. Water and salt are the products of a neutralization reaction.

B. True or False (If the statement is false, rewrite the statement to make it true)

T 11. A strong base and a weak base could have the same pH level.

F 12. An acid with a pH of 2 is ~~20~~ 100 times stronger than an acid with a pH of 4.

T 13. Each 1 unit on the pH scale represents a tenfold increase in concentration.

F 14. ~~Decreasing~~ increasing the surface area of a reactant would increase the rate of reaction.

T 15. Increasing the concentration of the reactants would increase the rate of reaction.

F 16. ~~Decreasing~~ increasing the temperature of the reaction would increase the rate of reaction.

F 17. Phenolphthalein turns pink in ~~an acid.~~ base

C. Similarities/Differences (describe similarities/differences between each pair)

18. acid/base
- both are ionic aqueous ~~substances~~
- acids ionize to form H^+
- bases ionize to form OH^-

19. red litmus/blue litmus
- ~~both~~ are indicators of pH level
- red litmus turns blue in a base
- blue litmus turns red in an acid

20. surface area/temperature
- both are factors that can effect the rate of reaction
- ↑ in s.a. ↑ rate of reaction
- ↑ in temp. ↑ rate of reaction

21. concentration/ionization
- both are factors that effect the strength of an acid/base
- concentration is the amount of H^+ or OH^- / 1L of H_2O
- ionization is how many H^+/OH^- ionize per molecule of acid/base

22. strong acid/weak acid
- both are acids
- strong completely ionize
- weak do not

23. bromothymol blue/phenolphtalein
- both are pH indicators
- BTB turns yellow in an acid
- phenolphthalein turns pink in a base

24. H^+/OH^-
- both are ions
- H^+ are acid ions
- OH^- are base ions

25. metal oxides/non-metal oxides
- both are oxides
- metal oxides form basic solutions in wate
- non-metal oxides form acidic solutions with

D. **Multiple choice** (Choose the best answer)

26. Which of the following is an acid?
    a) NaOH
    b) H_2O
    c) HCH_3CO_2
    d) $Mg(OH)_2$

27. Which of the following would make an acid when dissolved in water?
    a) sulphur trioxide
    b) magnesium oxide
    c) aluminum oxide
    d) copper(I) oxide

28. Which of the following would make a base when dissolved in water?
    a) carbon dioxide
    b) sulphur trioxide
    c) sodium oxide
    d) nitrogen dioxide

29. What type of reaction occurs between NaOH + HCl?
    a) synthesis
    b) decomposition
    c) single displacement
    d) double displacement

30. The pH of the reaction in # 29 should be
    a) 0
    b) 5
    c) 7
    d) 9

31. When Alkaseltzer is ground into a powder, it reacts more quickly in water. This is an example of the effect of:
    a) concentration
    b) surface area
    c) temperature
    d) a catalyst

32. Cake batter rises when the cake is baked. This is an example of the effect of:
    a) concentration
    b) surface area
    c) temperature
    d) a catalyst

33. Which of the following is a strong acid?
    a) HCH_3CO_2
    b) NaOH
    c) HCl
    d) $HC_2H_5O_2$

E. Characteristics of Acids & Bases (fill in the following chart)

INDICATOR/TEST	ACID	BASE
Red Litmus Paper	red	blue
Blue Litmus Paper	red	blue
Phenolphthalein	clear	pink
Bromothymol Blue	yellow	blue
Feel	watery	slippery
Taste	sour	bitter
Reaction with Mg	hydrogen gas	no reaction
Reaction with baking soda	carbon dioxide gas	no reaction
Conductivity	conducts electricity	conducts electricity

F. Making Acids & Bases (write out the acid or base product and then balance the equation)

34. ___ $SO_{3(g)}$ + ___ $H_2O_{(l)}$ → H_2SO_4 (aq)

35. ___ $K_2O_{(s)}$ + ___ $H_2O_{(l)}$ → $2KOH$ (aq)

36. ___ $Na_2O_{(s)}$ + ___ $H_2O_{(l)}$ → $2NaOH$ (aq)

37. ___ $CO_{2(g)}$ + ___ $H_2O_{(l)}$ → H_2CO_3 (aq)

38. ___ $MgO_{(s)}$ + ___ $H_2O_{(l)}$ → $Mg(OH)_2$ (aq)

G. Neutralization (Write down the acid and base required to produce the following salts)

39. Na_2SO_4 $NaOH(aq) + H_2SO_4(aq) \rightarrow$

40. $MgCl_2$ $Mg(OH)_2(aq) + HCl(aq) \rightarrow$

41. $NaNO_3$ $NaOH(aq) + HNO_3(aq) \rightarrow$

42. Li_3PO_4 $LiOH(aq) + H_3PO_4(aq) \rightarrow$

43. KCl $KOH(aq) + HCl(aq) \rightarrow$

H. Identification of unknowns. (Explain how to identify each substance in the beakers by using different tests)

44. Suppose you are given five beakers, each containing an unknown liquid. One is distilled water, one is a strong acid, one is a weak acid, one is a base and one is a salt solution. Describe how you would find out which was which.

conductivity apparatus → if no conductivity = distilled water

pH paper: > 7 = base
= 7 = distilled water
< 7 could be strong or weak acid

conductivity apparatus: strong acid conducts electricity better than weak acid

I. Acid-Base Application.

45. Explain why putting lemon on bitter tasting fish helps to minimize the bitter taste of fish.

lemon is an acid, bitter tasting fish is a base
A neutralization reaction between an acid + base makes salt + water with a pH of 7 ∴ reduces the bitter (basic) taste.

46. A healthy pool has a pH level between 6.7 and 7.2. When a pool's pH level becomes too basic, algae starts to grow. If algae began to grow in the pool, what would you recommend that the pool owner should do to counter act the algae growth?

Add some acid (chlorine) to lower the pool's pH to stop the algae growth.