Test # 3 **Name** _____

Directions: Each question has only one correct answer. Mark with X one of the lettered choices.

1. Which pair of symbols below shows different isotopes of the same element?

A) $^{39}_{18}A$ and $^{39}_{19}R$ B) $^{60}_{27}X$ and $^{59}_{28}Y$ C) $^{12}_{6}L$ and $^{14}_{6}L$ D) $^{37}_{17}X$ and $^{37}_{17}X$

2. As the elements of period 2 are considered from left to right, there is generally a decrease in:

A) ionization energy B) electronegativity
C) metallic character D) nonmetallic character

3. Element X is in Group I of the periodic table. X reacts with element Y to form an ionic compound. Which equation shows the process that takes place when X forms ions?

A) $X + e^- \rightarrow X^+$ B) $X - e^- \rightarrow X^-$ C) $X + e^- \rightarrow X^-$ D) $X - e^- \rightarrow X^+$

4. Which molecule is a nonpolar molecule?

A) NH_3 B) CH_3OH C) CO_2 D) H_2O

5. Allows solids to conduct electricity:

A) hydrogen bonding B) ionic bonding
C) metallic bonding D) polar covalent bonding

6. Which of the following changes will cause an increase in the rate of reaction $CH_4 + Br_2 \longrightarrow CH_3Br + HBr$?

A) increasing the concentration of Br_2 B) decreasing the concentration of CH_4
C) increasing the concentration of HBr D) decreasing the temperature

7. Which takes place when a catalyst is added to a reaction at equilibrium?

A) the point of equilibrium is shifted to the right
B) the point of equilibrium is shifted to the left
C) the forward and reverse reactions rates are increased unequally
D) the forward and reverse reactions rates are increased equally

8. Which of the following changes to the equilibrium $2\ NOCl(g) \rightleftharpoons 2\ NO(g) + Cl_2(g)$ would serve to decrease the concentration of Cl_2?

A) increasing the concentration of NOCl

B) decreasing the concentration of NO

C) increasing the pressure

D) decreasing the pressure

9. Which of the following is an observable property of many acids?

A) they become slippery when reacting with water

B) they react with metals to release hydrogen gas

C) they produce salts when mixed with other acids

D) they become more acidic when mixed with a base

10. Which pH value demonstrates a solution with the greatest concentration of H^+ ions?

A) 1 B) 5 C) 10 D) 14

11. Which of the reactions shown below represents a Brønsted acid-base reaction?

A) $Ca^{2+} + CO_3^{2+} \longrightarrow CaCO_3$

B) $HCO_3^- + H^+ \longrightarrow H_2CO_3$

C) $Fe + Cu^{2+} \longrightarrow Fe^{2+} + Cu$

D) $CaCO_3 + H_2CO_3 \longrightarrow Ca(HCO_3)_2$

12. When an ionic compound is dissolved in water, the particles in solution can be best described as:

A) hydrated molecules only

B) both hydrated molecules and ions

C) dehydrated molecules and ions

D) hydrated ions only

13. Which of the following dilute solutions has a freezing point closest to 0^oC?

A) 0.010 mol/L $CuSO_4$

B) 0.010 mol/L CH_3COOH

C) 0.010 mol/L $FeCl_3$

D) 0.010 mol/L Na_2SO_4

14. Of the compounds below, in which one does hydrogen have the lowest oxidation number?

A) NH_3 B) H_2 C) NaH D) HCl

15. All of the following are true of aluminum except:

A) it is good conductor of electricity

B) it is a metal of high density

C) it is a good reducing agent

D) its hydroxide is soluble in both, strong base and acid

16. The general formula for the alkyne series is:

A) C_nH_n B) C_nH_{2n} C) C_nH_{2n+2} D) C_nH_{2n-2}

17. The compound C_4H_9OH is an isomer of:

A) $C_3H_7COCH_3$ B) $C_2H_5OC_2H_5$ C) $CH_3COOC_2H_5$ D) CH_3COOH

18. The reagent than can be used to distinguish between pentane and pentene is:

A) Br_2 (water solution) B) $Cu(OH)_2$ C) $FeCl_3$ D) HCl

19. What could be the name of a compound that has the general formula R-OH?

A) methanol B) methane C) methyl metanoate D) methanoic acid

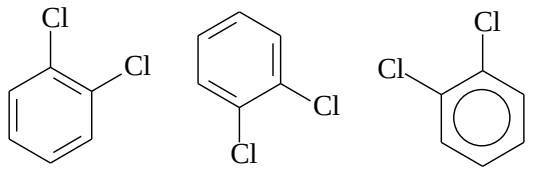
20. A reaction between an acid and alcohol produces an ester and:

A) CO_2 B) water C) glycerol D) ethanol

21. Slight oxidation of a primary alcohol gives:

A) a ketone B) an organic acid C) an ether D) an aldehyde

22. The structures shown below are:



A) constitutional isomers

B) homologues

C) stereoisomers

D) one and the same compound

23. Which of the following substituents is not an ortho, para director in an electrophilic aromatic substitution reaction?

A) $-CH_3$ B) $-NHC(=O)CH_3$ C) $-OH$ D) $-C(=O)NH_2$

D)

24. A carbonyl group is present in all of these functional groups except:

A) ketones B) aldehydes C) esters D) ethers

25. Which of the following equations represents a condensation reaction?

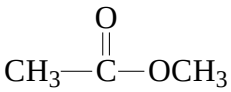
A) $CH_3CH_2CH_3 + Br_2 \rightarrow CH_3CH_2CH_2Br + HBr$

B) $CH_3CH = CH_2 + HBr \rightarrow CH_3{-}CH_2{-}CH_2Br$

C) $CH_3CH_2COOH + NaOH \rightarrow CH_3CH_2COONa + H_2O$

D) $CH_3COOH + CH_3CH_2OH \rightarrow CH_3COOCH_2CH_3 + H_2O$

26. What is the name of the following compound?



A) Ethyl ethanoate

B) Ethyl methanoate

C) Methyl ethanoate

D) Methyl propanoate

27. Which compound is an ester?

A) CH_3COOH B) CH_3CHO C) CH_3COCH_3 D) CH_3COOCH_3

28. Hydrolysis of sucrose produces:

A) two molecule glucose B) two molecules fructose

C) glucose and ribose D) glucose and fructose

29. All of the native α-amino acids can react with the reagents below except:

A) NaOH B) $FeCl_3$ C) HCl D) glycine

30. Proteins are large macromolecules composed of thousands of subunits. The structure of the protein depends on the sequence of:

A) lipids B) monosaccharides C) amino acids D) nucleosides