

1. Balance the following equation. What is the sum of the coefficients of the reactants and products?



- a) 21                      b) 24                      c) 18                      d) 27

2. An atom has an atomic number of 7 and a mass number of 14. How many electrons will it have in its valence level:

- a) 2                      b) 3                      c) 4                      d) 5

3. Calculate the molar concentration of the solution produced by dissolving 11g of  $\text{K}_2\text{SO}_4$  in  $125 \text{ cm}^3$  of water (atomic masses are: K=39; S=32; O=16)

- a) 0.05 M                      b) 0.5 M                      c) 0.25 M                      d) 0.025 M

4. Select a group of acids according to Brønsted concept:

- a)  $\text{CH}_3\text{COO}^-$ , HCl,  $\text{H}_2\text{O}$ ,  $\text{HCO}_3^-$   
b) HCl,  $\text{H}_2\text{O}$ ,  $\text{NH}_4^+$ ,  $\text{HS}^-$   
c)  $\text{H}_2\text{SO}_4$ ,  $\text{Cl}^-$ ,  $\text{H}_3\text{O}^+$ ,  $\text{CH}_3\text{NH}_2$   
d)  $\text{H}_2\text{CO}_3$ ,  $\text{CH}_3\text{NH}_2$ ,  $\text{H}_3\text{O}^+$ , HCl

5. The bond between sulfur and chlorine would be:

- a) not formed  
b) ionic  
c) polar covalent  
d) nonpolar covalent

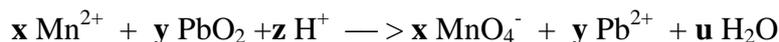
6. How many protons, neutrons, and electrons does monovalent cation of  $^3_1\text{H}$  have?

- a) 1, 2, 0                      b) 2, 1, 3                      c) 3, 2, 1                      d) 1, 2, 3

7. As you move up and to the right on the periodic table:

- a) atomic radius increases and electronegativity increases  
b) atomic radius decreases and electronegativity increases  
c) atomic radius increases and electronegativity decreases  
d) atomic radius decreases and electronegativity decreases

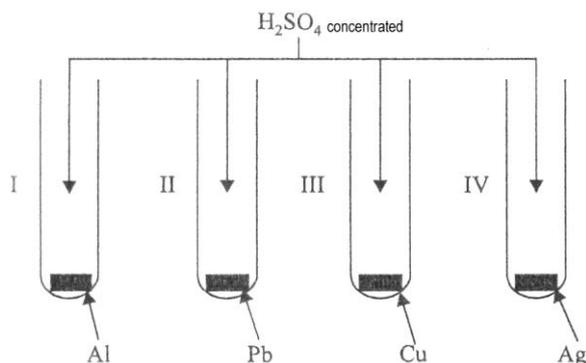
8. Balance the equation:



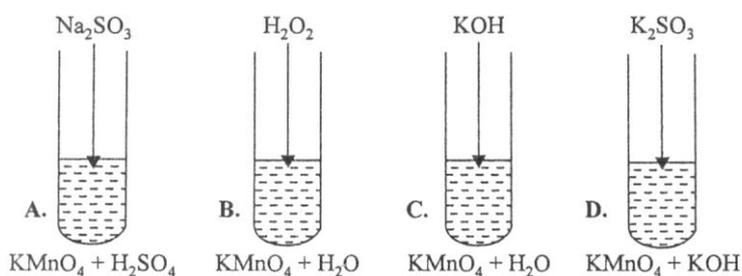
	<b>x</b>	<b>y</b>	<b>z</b>	<b>u</b>
a)	5	2	4	2
b)	2	3	6	3
c)	2	5	4	2
d)	1	2	8	4

9. Where does the metal react with acid to form salt?

- a) I and II
- b) II and IV
- c) III and IV
- d) I and IV

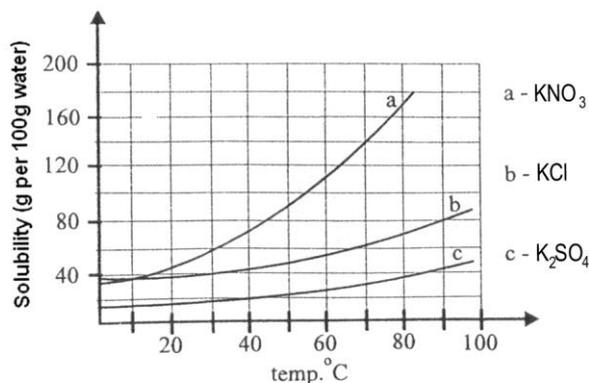


10. Discoloration of  $\text{KMnO}_4$  appears in tube no:



11. Into 3 beakers with 100g of water each (temp.  $313\text{K} - 40^\circ\text{C}$ ), were added 80g  $\text{KNO}_3$ , 30g  $\text{KCl}$  and 10g of  $\text{K}_2\text{SO}_4$  respectively. Which salt will be completely dissolved?

- a) only  $\text{KCl}$
- b)  $\text{KCl}$  and  $\text{K}_2\text{SO}_4$
- c) only  $\text{KNO}_3$
- d) all salts



12. How many  $\text{cm}^3$  of concentrated 96%  $\text{H}_2\text{SO}_4$  ( $d=1.84 \text{ g/cm}^3$ ) are required to prepare  $1 \text{ dm}^3$  0.125 M

- a)  $\sim 6.9 \text{ cm}^3$
- b)  $\sim 20.7 \text{ cm}^3$
- c)  $\sim 26.7 \text{ cm}^3$
- d)  $\sim 33.6 \text{ cm}^3$

13. Choose the group in which there are only acidic oxides:

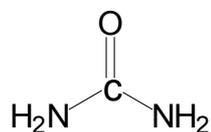
- a)  $\text{CO}_2$ ,  $\text{Cr}_2\text{O}_3$ ,  $\text{PbO}$
- b)  $\text{NO}$ ,  $\text{NO}_2$ ,  $\text{N}_2\text{O}_5$
- c)  $\text{CrO}_3$ ,  $\text{NO}_2$ ,  $\text{SO}_2$
- d)  $\text{CrO}$ ,  $\text{CrO}_3$ ,  $\text{Cr}_2\text{O}_3$

14. Water solution of acid (formula HR) contains 0.2 mol R<sup>-</sup> and 2 mol of undissociated HR molecules. Degree of dissociation is equal:

- a) 0.091                      b) 0.100                      c) 0.182                      d) 0.200

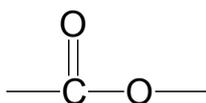
15. What is the hybridization of the carbon atom in urea?

- a) sp  
b) sp<sup>2</sup>  
c) sp<sup>3</sup>  
d) sp<sup>4</sup>

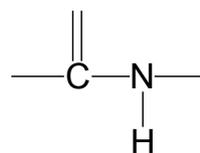


16. Amino acids are essential to life in that they are what make up proteins. Without proteins, the world as we know it would be a barren, lifeless entity. Amino acids can "join" together to form chains of amino acids. What is the bond that is formed between two amino acids specifically presented?

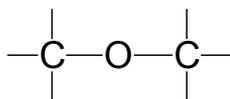
a)



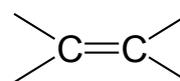
b)



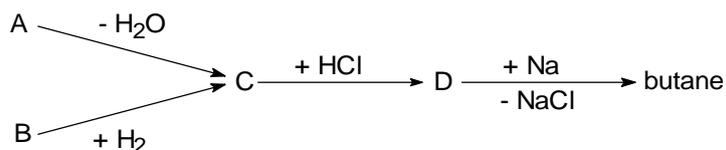
c)



d)



17. Reaction:



	A	B	C	D
a)	ethanol	ethylene (ethene)	ethylene (ethene)	ethylene chloride
b)	ethanol	acetylene	ethylene (ethene)	ethylene chloride
c)	acetic acid	acetaldehyde	ethanol	ethylene chloride
d)	ethanal hydrate	acetic acid	ethanol	sodium ethoxide

18. What type of reaction is observed between trans-2-hexene with hydrogen bromide?

- a) Substitution reaction  
b) Addition reaction  
c) Condensation reaction  
d) Oxidation reaction

19. In cellulose, the monosaccharide molecules are bonded by:

- a) ester linkage
- b) ether linkage
- c) glycosidic bond
- d) oxygen-oxygen bond

20. The result of oxidation of 2-propanol is:

- a) propanal
- b) propanone
- c) propanoic acid
- d) propene

21. Which formula represents a compound formed in the muscles during physical exercises?

- a)  $\text{CH}_3\text{CH}(\text{NH}_2)\text{COOH}$
- b)  $\text{C}_6\text{H}_4(\text{OH})\text{COOH}$
- c)  $\text{C}_{15}\text{H}_{31}\text{COOH}$
- d)  $\text{C}_2\text{H}_4\text{OHCOOH}$

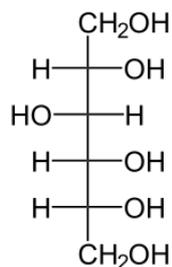
22. Tollens test enables distinction of:

- a) butene from butane
- b) butanal from butanone
- c) butanal from propanal
- d) butanone from propanone

23. Secondary alcohol is:

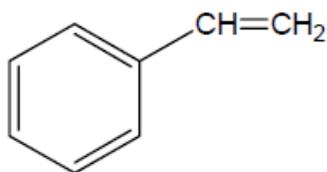
- a) 3-methyl-1-butanol
- b) 3-methyl-3-hexanol
- c) 2-methyl-2-pentanol
- d) 3-methyl-2-butanol

24. The following compound called sorbitol is obtained from glucose during:



- a) oxidation reaction
- b) neutralization reaction
- c) hydrolysis reaction
- d) reduction reaction

25. What is produced when the following molecule is polymerized?



- a) teflon
- b) polyvinyl chloride
- c) polystyrene
- d) saran