CHEMISTRY

1. Sodium hydroxide is a strong base. What is the pH in a 0.01 mol/dm^3 solution?
   a. pH=2
   b. pH=12
   c. pH=-2
   d. pH=0.01 mol/dm^3

2. Which of the the following is NOT a valid electronic structure?
   a. 2,8,4
   b. 2,6
   c. 2,9,1
   d. 2,8,8,2

3. What numerical values of X and Y are required to balance the reaction below:

   $I_2 + \mathbf{X}\ OCl^- + 2OH^- \rightarrow \mathbf{Y}\ IO^-_3 + 5Cl^- + H_2O$

   a. 2, 2
   b. 5, 5
   c. 5, 2
   d. 2, 5

4. What is molecular weight of benzene, C_6H_6:
   a. 18
   b. 36
   c. 78
   d. 90

5. The cell membrane of the red blood cell will allow water, oxygen, carbon dioxide, and glucose to pass through. Because other substances are blocked from entering, this membrane is called:
   a. perforated
   b. semi- permeable
   c. non- conductive
   d. permeable

6. Energy is released from ATP when the bond is broken between:
   a. ribose and a phosphate group
   b. adenine and ribose
   c. adenine and a phosphate group
   d. two phosphate groups

7. The atom with electronic configuration $K^2L^8M^8N^2$ is?
   a. Mg
   b. Ca
   c. Sr
   d. Zn

8. Identify the number of protons and electrons in the Sc^{3+} ion. (Atomic number of Sc=21)
   a. 18 protons, 21 electrons
   b. 18 protons, 15 electrons
   c. 15 protons, 18 electrons
   d. 21 protons, 18 electrons

9. Which of the following molecules has only one bond between carbon atoms that exhibits sp^3- sp^2 type hybridization?
   a. $CH_3CH_2CH{=}CHCH_3$
   b. CH_3CH_2CHO
   c. $CH_3CHOHCH_2CH_3$
   d. $CH_3CH_2CH_2NH_2$

10. Bicarbonate of soda (sodium hydrogen carbonate) is used in many commercial preparations. Its formula is $NaHCO_3$. Find the mass percentages (mass %) of Na in sodium hydrogen carbonate. (Atomic masses are: Na=23, O=16, C=12, H=1)
    a. 27.4%
    b. 19.32%
    c. 14.3%
    d. 48.6%