

Assignment - 5

- ⌘ Acids, Bases and Salts
- ⌘ Analytical Chemistry
- ⌘ Metallurgy
- ⌘ Practical Chemistry

ACIDS, BASES AND SALTS
Assignment Sheet

1. Answer the following questions relating your answers only to salts in the list given below : Anhydrous CaCl_2 , $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$.
- Which compound is efflorescent?
 - Which compound is blue in colour?
 - Which compound is deliquescent?
 - What would be seen on mixing the solution of calcium chloride with the solution of sodium carbonate?
 - Write the balanced equation for the reaction occurring when a solution of calcium chloride is mixed with a solution of sodium carbonate. **[1999]**

2. (a) Define the following terms:
- Acid
 - pH scale
 - Neutralization
- (b) (i) Outline the steps that would be necessary to convert insoluble lead(II) oxide into insoluble lead chloride.
- (ii) Write the balanced equations for the reactions required to convert insoluble lead(II) oxide into insoluble lead chloride.
- (iii) If iron reacts with dilute sulphuric acid, what will be the products?
- (iv) A solution of iron(III) chloride has a pH less than 7. Is the solution acidic or alkaline? **[1999]**

3. Some methods used for the laboratory preparation of salts are :

- A — Metal + Acid
B — Carbonate + Acid
C — Precipitation (double decomposition)
D — Direct combination
E — Titration

Copy and complete the following table :

Salt	Method of preparation
(a) Ammonium sulphate	
(b) Calcium carbonate	
(c) Iron (III) chloride	
(d) Lead nitrate	
(e) Zinc sulphate	

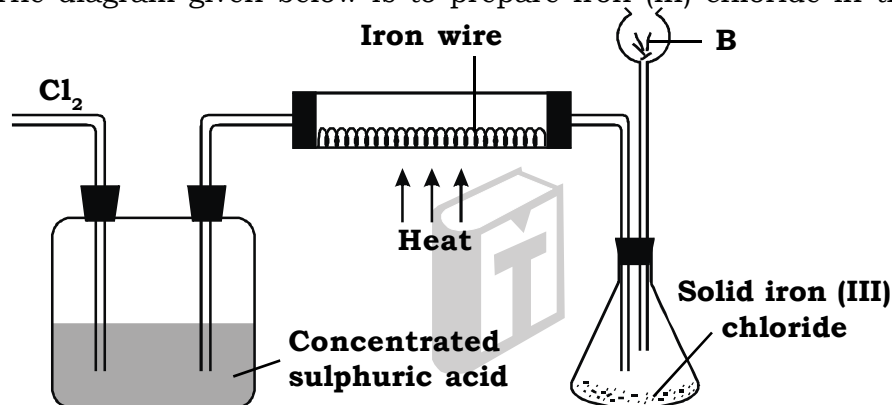
[2000]

4. Mention the terms defined by the following sentences :
- A soluble base.
 - The insoluble solid formed when two solutions are mixed together.
 - An acidic solution in which there is only partial ionization of the solute molecules. **[2001]**

5. From the formulae listed below, choose one in each case, corresponding to the salt having the given description :
 AgCl , CuCO_3 , $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, KNO_3 , NaCl , NaHSO_4 , $\text{Pb}(\text{NO}_3)_2$, ZnCO_3 , $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$
- An acid salt.
 - An insoluble chloride.
 - On treating with concentrated sulphuric acid, this salt changes from blue to white.
 - On heating, this salt changes from green to black.
 - This salt gives nitrogen dioxide on heating. **[2001]**
6. Write the balanced equation for the following reaction :
An acid and an alkali
(You must first write "The acid is and the alkali is.....", then write the equation.) **[2001]**
7. Write the balanced equations for the preparation of the following compounds as the major product starting from iron and using only one other substance:
- Iron(II) chloride
 - Iron(III) chloride
 - Iron(II) sulphate
 - Iron(II) sulphide **[2002]**
8. Write the equations for the laboratory preparation of the following salts using sulphuric acid :
- Iron(II) sulphate from iron
 - Copper sulphate from copper
 - Lead sulphate from lead nitrate
 - Sodium sulphate from sodium carbonate. **[2003]**
9. Choosing the correct words given in brackets, complete the sentences given below :
- An acid is a compound which, when dissolved in water, gives (hydronium / hydroxide) ions as the only (positive/negative) ions.
 - A(n)..... (acid/basic) salt is one in which the hydrogen of an acid has been partially replaced by a (metal/non-metal). **[2003]**
10. Which of the following methods A, B, C, D or E is generally used for preparing the chlorides listed below from (a) to (e)? Answer by writing down the chloride and the letter pertaining to the corresponding method. Each letter is to be used only once.
- Action of an acid on a metal
 - Action of an acid on an oxide or carbonate
 - Direct combination
 - Neutralization of an alkali by an acid
 - Precipitation (double decomposition)
- Copper (II) chloride
 - Iron (II) chloride
 - Iron (III) chloride
 - Lead (II) chloride
 - Sodium chloride **[2004]**

11. The questions (a) to (c) refer to the following salt solutions listed A to F.
- A. Copper nitrate
 - B. Iron (II) sulphate
 - C. Iron (III) chloride
 - D. Lead nitrate
 - E. Magnesium sulphate
 - F. Zinc chloride
- (a) Which two solutions will give a white precipitate when treated with dilute hydrochloric acid followed by barium chloride solution?
- (b) Which two solutions will give a white precipitate when treated with dilute nitric acid followed by silver nitrate solution?
- (c) Which solution will give a white precipitate when either dilute hydrochloric acid or dilute sulphuric acid is added to it? **[2005]**
12. Fill in the blanks with suitable words.
An acid is a compound which when dissolved in water forms hydronium ions as the only (a) ions. A base is a compound which if soluble in water contains (b) ions. A base reacts with an acid to form a (c) and water only. This type of reaction is known as (d) **[2005]**
13. Mention the colour changes observed when the following indicators are added to acids.
- (a) Alkaline phenolphthalein solution
 - (b) Methyl orange solution
 - (c) Neutral litmus solution
- [2006]**
14. Write balanced equations for the following reactions :
- (a) Lead sulphate from lead nitrate solution and dilute sulphuric acid.
 - (b) Lead chloride from lead nitrate solution and sodium chloride solution.
- [2007]**
15. From the list given below, select the word(s) required to correctly complete blanks (i) to (v) in the following passage :
- ammonia ammonium, carbonate, carbon dioxide, hydrogen, hydronium, hydroxide, precipitate, salt, water.
- A solution X turns blue litmus red, so it must contain (i) ions; another solution Y turns red litmus blue and therefore, must contain (ii) ions. When solutions X and Y are mixed together, the products will be a (iii)..... and (iv) If a piece of magnesium were put into solution X, (v) gas would be evolved.
- (Note :** Words chosen from the list are to be used only once. Write the answers as (i), (ii), (iii) and so on. Do not copy the passage.) **[2007]**
16. Match the following :
- | Column A | Column B |
|------------------|--------------------------------|
| (a) Acid salt | (i) Sodium potassium carbonate |
| (b) Mixed salt | (ii) Alum |
| (c) Complex salt | (iii) Sodium carbonate |
| (d) Double salt | (iv) Sodium zincate |
| (e) Normal salt | (v) Sodium hydrogen carbonate |
- [2007]**

17. What are the terms defined below?
 (a) A salt containing a metal ion surrounded by other ions or molecules.
 (b) A base which is soluble in water. [2008]
18. Making use only of substances chosen from those given below :
 Dilute sulphuric acid sodium carbonate
 Zinc sodium sulphite
 Lead calcium carbonate
 Give the equations for the reactions by which you could obtain :
 (a) hydrogen
 (b) sulphur dioxide
 (c) carbon dioxide
 (d) zinc carbonate (two steps required) [2008]
19. Write the equation(s) for the reaction(s) to prepare lead sulphate from lead carbonate. [2009]
20. The diagram given below is to prepare Iron (III) chloride in the laboratory:



- (a) What is substance B?
 (b) What is the purpose of B?
 (c) Why is iron(III) chloride to be stored in a closed container?
 (d) Write the equation for the reaction between iron and chlorine. [2009]
21. Give the equations for the following conversions A to E.
- $$\begin{array}{ccccc} \text{ZnSO}_4 & \xrightarrow{\text{A}} & \text{ZnCO}_3 & \xrightarrow{\text{B}} & \text{Zn(NO}_3)_2 \\ & & & & \downarrow \text{C} \\ & & & & \text{Zn(OH)}_2 \\ & & & \xleftarrow{\text{D}} & \\ & \swarrow \text{E} & & & \\ & \text{ZnO} & & & \end{array}$$
- [2010]
22. Name the method used for preparation of the following salts from the list given below :
- | | |
|-------------------------------|--------------------------|
| (i) Sodium nitrate | (ii) Iron (III) chloride |
| (iii) Lead chloride | (iv) Zinc chloride |
| (v) Sodium hydrogen sulphate. | |
- List :
- | | |
|---------------------------|--------------------------|
| (A) Simple displacement | (B) Neutralization |
| (C) Decomposition by acid | (D) Double decomposition |
| (E) Direct synthesis | |
- [2011]

23. What happens to the crystals of washing soda when exposed to air ? Name the phenomenon exhibited. **[2011]**
24. Match the following in column A with the correct answer from the choices given in column B :
- | Column A | Column B |
|-----------------|---------------------------------|
| (a) Acid salt | (i) Ferrous ammonium sulphate |
| (b) Double salt | (ii) Contains only ions |
| | (iii) Sodium hydrogen sulphate |
| | (iv) Contains only molecules |
| | (v) Contains ions and molecules |
- [2012]**
25. From the list given below, select the word(s) required to correctly complete blanks (i) to (v) in the following passage. The words from the list are to be used only once. Write the answers as (a) (i), (ii), (iii) and so on. Do not copy the passage.
[ammonia, ammonium, carbonate, carbon dioxide, hydrogen, hydronium, hydroxide, precipitate, salt, water]
- (i) A solution M turns blue litmus red, so it must contain (i) ions; another solution O turns red litmus blue and hence, must contain (ii) ions.
- (ii) When solutions M and O are mixed together, the products will be (iii) and (iv)
- (iii) If a piece of magnesium was put into a solution M, (v) gas would be evolved. **[2013]**
26. Give suitable chemical terms for the following :
- (i) A definite number of water molecules bound to some salts.
- (ii) The process in which a substance absorbs moisture from the atmospheric air to become moist, and ultimately dissolves in the absorbed water. **[2013]**
27. Choose the most appropriate answer from the following options:
- (i) Which one of the following will not produce an acid when made to react with water ?
- (a) Carbon monoxide
(b) Carbon dioxide
(c) Nitrogen dioxide
(d) Sulphur trioxide.
- (ii) Identify the metallic oxide which is amphoteric in nature :
- (a) Calcium oxide
(b) Barium oxide
(c) Zinc oxide
(d) Copper(II) oxide. **[2013]**
28. Choosing the substances from the list given
Dilute Sulphuric acid, Copper, Copper (II) carbonate, Iron, Sodium carbonate, Sodium, Sodium chloride, Zinc nitrate,
Write balanced chemical equations for the reactions which would be used in the laboratory to obtain the following salts:
- (i) Sodium sulphate. (ii) Zinc carbonate
(iii) Copper (II) sulphate (iv) Iron (II) sulphate **[2013]**

