

ANALYTICAL CHEMISTRY
Assignment Sheet

1. (a) Choose the correct word or phrase from the brackets to complete the following sentence :
Heating ammonium chloride with sodium hydroxide produces
(ammonia / nitrogen)
- (b) Write correctly the balanced equation for the reaction mentioned in statement above. **[1999]**

2. Write balanced equations for the following reactions:
- (a) Iron(III) chloride solution with sodium hydroxide solution.
(b) Chlorine and cold dilute sodium hydroxide solution.
(c) Zinc and sodium hydroxide solution.
(d) Sulphur dioxide and sodium hydroxide solution. (Give the equation for the formation of the normal salt) **[2000]**

4. Copy and complete the following which summarizes the effect of adding a small amount of sodium hydroxide to various salt solutions followed by an excess of the reagent, and then adding ammonium hydroxide (ammonia solution) in a small amount followed by an excess to another sample of each of the salt solutions.

Solution	Effect of adding sodium hydroxide solution		Effect of adding ammonium hydroxide solution	
	Small amount	In excess	Small amount	In excess
Calcium nitrate				
Zinc nitrate				
Lead nitrate				[2000]

5. State what do you observe when: ammonium hydroxide is added to iron (III) sulphate solution. **[2001]**
6. Tests were performed on aq. solution 'A' & 'B' and the conclusions were drawn. State the observations seen in each case
- a) TEST : To solution 'A' sodium hydroxide solution was added. Conclusions : B contains Fe^{3+} ions.
- b) TEST : To solution 'B' ammonium hydroxide was added slowly till in excess. Conclusions : C contains Cu^{2+} ions. **[2002]**
7. Write the observations and balanced equations for the following reactions:
- (a) Sodium hydroxide is added dropwise in a small quantity and then in excess to a solution of zinc sulphate.
(b) Ammonium hydroxide is added first in a small quantity and then in excess to a solution of copper sulphate.
(c) Excess of ammonium hydroxide is added to a substance obtained by adding hydrochloric acid in silver nitrate solution. **[2003]**

8. How would you distinguish between Zn^{2+} and Pb^{2+} using ammonium hydroxide solution? **[2003]**
9. Sodium hydroxide solution is added first in a small quantity, then in excess to the aqueous salt solutions of copper (II) sulphate, zinc nitrate, lead nitrate, calcium chloride and iron (III) sulphate. Copy the following table and write the colour of the precipitate in (i) to (v) and the nature of the precipitate (soluble or insoluble) in (vi) to (x).

Aqueous salt solution	Colour of precipitate when NaOH is added in a small quantity	Nature of precipitate (soluble or insoluble) when NaOH is added in excess
Copper (II) sulphate	(i)	(vi)
Zinc nitrate	(ii)	(vii)
Lead nitrate	(iii)	(viii)
Calcium chloride	(iv)	(ix)
Iron (III) sulphate	(v)	(x)

[2004]


10. The questions (a) to (b) 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 solution becomes deep/inky blue in colour when excess of ammonium hydroxide is added to it?
- (b) Which solution gives a white precipitate with excess of ammonium hydroxide solution? **[2005]**
11. From the list of substances given - Ammonium sulphate, Lead carbonate, Chlorine, Copper nitrate, Ferrous sulphate - State a solution of the compound which gives a dirty green precipitate with sodium hydroxide. **[2006]**
12. Write a balanced equation for the reaction between - aluminium oxide & sodium hydroxide solution. **[2006]**
13. Give one test to distinguish between the following :- Iron (III) chloride soln. and copper chloride soln. **[2006]**
14. The salt which in soln. gives a pale green precipitate with NaOH soln. and a white ppt. with $BaCl_2$ soln.
 [a] Iron(III) sulphate [b] Iron (II) sulphate [c] Iron (II) chloride **[2008]**
15. Find the odd one with reasons [valency is not a criterion] :
 $Al(OH)_3$, $Pb(OH)_2$, $Mg(OH)_2$, $Zn(OH)_2$. **[2009]**
16. Identify the substance P based on the information given : The deliquescent salt P, turns yellow on dissolving in water, and gives a reddish brown precipitate with sodium hydroxide solution. **[2009]**

17. Give an equation for - [i] ZnO reacts with NaOH soln.,
[ii] Conversion of - $\text{Zn}(\text{NO}_3)_2$ to $\text{Zn}(\text{OH})_2$ **[2010]**
18. Select the correct answer from A, B, C - A : Sodium hydroxide soln. B : A weak acid, C : Dil. sulphuric acid. The solution which with zinc sulphate solution will give a white precipitate. **[2010]**
19. Sodium hydroxide solution is added to the solutions containing the ions mentioned in List X. List Y gives the details of the precipitate. Match the ions with their coloured precipitates. **[2011]**

List X	List Y
(i) Pb^{2+}	(A) Reddish brown
(ii) Fe^{2+}	(B) White insoluble in excess
(iii) Zn^{2+}	(C) Dirty green
(iv) Fe^{3+}	(D) White soluble in excess
(v) Cu^{2+}	(E) White soluble in excess
(vi) Ca^{2+}	(F) Blue

20. Name : The gas evolved on reaction of aluminium with boiling conc. caustic alkali solution. **[2012]**
21. State one observation for the following :
(i) Excess ammonium hydroxide soln. is added to lead nitrate soln.
(ii) Sodium hydroxide soln. is added to ferric chloride soln. at first a little and then in excess. **[2012]**
22. Give a chemical test to distinguish between the following pairs of compounds :
(i) Sodium chloride solution and sodium nitrate solution.
(ii) Hydrogen chloride gas and hydrogen sulphide gas.
(iii) Calcium nitrate solution and zinc nitrate solution.
(iv) Carbon dioxide gas and sulphur dioxide gas. **[2013]**
23. State relevant observations for each of the following :
(i) Ammonium hydroxide solution is added to copper (II) nitrate solution in small quantities and then in excess.
(ii) Ammonium hydroxide solution is added to zinc nitrate solution in minimum quantities and then in excess. **[2013]**
24. State your observation in each of the following cases :
When calcium hydroxide is heated with ammonium chloride crystals. **[2014]**
25. The following table shows the test a student performed on four different aqueous solutions which are X, Y, Z and W. Based on the observations provided, identify the cation present: **[2015]**

Chemical test	Observation	Conclusion
1. To solution X, ammonium hydroxide is added in minimum quantity first and then in excess.	A dirty white precipitate is formed which dissolves in excess to form a clear solution.	(i)
2. To solution Y ammonium hydroxide is added in minimum quantity first and then in excess.	A pale blue precipitate is formed which dissolves in excess to form a clear inky blue solution.	(ii)
3. To solution W a small quantity of sodium hydroxide solution is added and then in excess.	A white precipitate is formed which remains insoluble.	(iii)
4. To a salt Z calcium hydroxide solution is added and then heated.	A pungent smelling gas turning moist red litmus paper blue is obtained.	(iv)

26. Choose the correct answer from the options given below :
- (i) A chloride which forms a precipitate that is soluble in excess of ammonium hydroxide is :
1. Calcium chloride
 2. Ferrous chloride
 3. Ferric chloride
 4. Copper chloride
- 
- [2017]**
27. Identify the substance underlined, in each of the following cases:
Cation that does not form a precipitate with ammonium hydroxide but forms one with sodium hydroxide. **[2017]**
28. State one relevant observation for each of the following reactions:
 Action of Sodium hydroxide solution on ferrous sulphate solution. **[2017]**

