[REF]

# Whitefield International College

Town Planning, Nayabazar, Kathmandu

## ASSIGNMENT

Class: XII F.M-100
Subject: Chemistry P.M.-40

### Group "A"

Attempt **any fifteen** questions. (15x2=30)

1. Define **$P^H$**. Calculate the $P^H$ of **0.1** M $H_2SO_4$.
2. Define ionic product of water. Why does ionic product of water increases with temperature?
3. What are requisites of a substance to act as primary standard?
4. Why is aqueous solution of **$FeCl_3$** acidic?
5. What happens when aniline is treated with aqueous bromine?
6. What volume of water must be added to **40** ml of **0.25** N acid solution in order to make it exactly decinormal?
7. State **Huckel's rule** of aromaticity. Write down the general formula of aromatic hydrocarbons.
8. Starting from benzene, how will you synthesize:
   a) Ethane-1,2-dial b) Acetophenone
9. What is meant by coupling reaction? Give an example.
10. Chloroform is stored in a dark brown bottle, why?
11. Convert:
    a) Ethoxyethane into methoxyethane.
    b) Aminoethane into aminomethane
12. What happens when dry HCl gas is passed through saturated solution of sodium chloride?
13. How will you convert aniline into phenol.
14. Define the terms i) **end point** ii) **equivalence point.**
15. What volumes of **0.2** N and **0.4** N HCl must be mixed to give **2** litre of **0.25** N hydrochloric acid solution?
16. State Ostwald's dilution law. What is its limitation?
17. Convert methanol into ethanol and vice versa.
18. Which of the following has most basic character? Explain.
    i) $NH_3$ ii) $(CH_3)_2NH$ iii) $CH_3NH_2$ iv) $C_6H_5NH_2$
19. Nitrobenzene is meta directing towards electrophilic substitution reaction, why?

### Group "B"

Attempt **any five** questions. (5x5=25)

20. Define degree of ionization. The solubility product of **$CaF_2$** in water at **18°c** is **$3.45x10^{-11}$**. Calculate its solubility in gram/litre. (1+4)
21. Describe the lab preparation of pure **trichloromethane** giving principle, procedure and labeled diagram.
22. What is redox titration? **0.4** gm of a metal was dissolved in **50** cc of **0.64** N HCl and the solution was diluted to **100** cc. Then **25** cc of this solution required **27.3** cc of **0.11N** NaOH for neutralization. Find the equivalent weight of metal.
23. Write down **any two** methods for the preparation of primary amines. Describe nitrous acid test for amines with necessary reactions. (2+3)
24. What is meant by solubility product of sparingly soluble electrolyte? Solubility product of ferric hydroxide is **$1.7x10^{-18}$** at a temperature. Find its solubility in i) water and ii) **0.1** M NaOH at the same temperature.
25. How is pure **aniline** prepared in the lab?
26. Give an example of each of the following reactions.
    i) Carbylamine reaction ii) Reimer-Tiemann reaction
    iii) Friedel-Craft reaction iv) Decarbonylation reaction
    v) Williamson's synthesis

### Group "C"

Attempt **any two** questions. (2x10=20)

27. Describe the principle and process with labeled diagram for the laboratory preparation of pure and dry **nitrobenzene.** How is nitrobenzene converted into:
    i) Hydrazobenzene ii) P-aminophenol
    iii) Aniline iv) P-hydroxyazobenzene
28. How is pure copper extracted from its pyrite ore? Explain its metallurgical operations with necessary reactions and diagrams.
29. Write short notes on **any two:**
    a) Selection of indicators in acid –base titration
    b) Lab preparation of ethoxy ethane.
    c) Lewis concept of acid and base
    d) **Hoffmann's method** for the separation of primary, secondary and tertiary amines.

**"The End"**

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## ASSIGNMENT

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### Group A

Attempt only 15 questions (15x2=30)

1. What is carbyl amine test? Write methods of safe storage of chloroform.
2. What happen when chloroform reacts with a) air b) phenol in presence of aqueous NaOH?
3. Convert: 2-chloropropane to 1-chloropropane.
4. What happen when?
   i.Benzene is heated with acetic anhydride in presence of anhydrous $AlCl_3$.
   ii.Sodium benzoate is heated with soda lime.
5. Why is benzene called aromatic compound according to Huckel's rule. Give the resonating structure of it.
6. Draw the graph for the titration of weak base and strong acid. Explain the indicator used.
7. 200 ml of HCl $P^H$ =2 and is mixed with 300 ml of NaOH $P^H$= 12.What will be the $P^H$ of the resulting mixture solution.
8. A. What is redox titration with an example?
   B. What will happen when HCl gas is passed through saturated sodium chloride solution? Mention the principle involved.
9. Calculate number of sulphuric acid molecules required to neutralize 4L of 2 N NaOH solutions.
10. Complete the followings.
    a) $A \xrightarrow{Na/dry\ ether/\Delta}$ 2,3 dimenthybutane
    b) Bromo ethane $\xrightarrow{KCN} A \xrightarrow{H_2O/H^+}$
11. What do you mean by normality and molarity?
12. What happens when diazotized solution of aniline is mixed with aniline under ice-cold condition?
13. Why is aqueous solution of $CH_3COONH_4$ is nearly neutral but $(CH_3COO)_2Ca$ is slightly basic?.
14. Calculate $_PH$ of $1x10^{-8}$ M $HNO_3$?
15. Define Lewis acid and base giving one example for each.
16. Define and give example of,
    a. Friedel Craft's alkylation reaction
    b. Iodoform reaction
17. An organic compound 'A' on ozonolysis gives compound' B' and compound A which on hydrogenation gives cyclohexane. Identify A and B.
18. Write the reaction of aniline with aq. Bromine.

### Group B

Attempt only 5 questions. (5x5=25)

19. Describe the lab preparation of pure trichloro methane with neat and well labeled diagram.
20. Write the possible isomers of $C_3H_9N$ and give their IUPAC name How can you separate the mixture of $1^0$ ,$2^0$ and $3^0$ amines by Hoffmann's method ?
21. What is ionic product of water? The $P^H$ of 0.1 M HCN solution is 5.2.What is value of $K_a$ for the acid.
22. Give reasons;
    a. In the titration of weak base and strong acid, phenolphthalein is not used.
    b. Concentration term molality is temperature independent.
    c. $Na_2CO_3$ is primary standard substance.
    d. Normality factor must be written along with normality of solution.
    e .Selection of indicator depends upon the $_PH$ range of equivalence point of acid base titration. 5
23. State solubility product principle. The solubility of AgCl in water at 298 is 1.43 $x10^{-3}$ g/L. Calculate its molar solubility in 0.5M KCl solution.(atomic mass of Ag =108)
24. Write the reduction product of nitro benzene in different medium.
25. Define the terms: titration, principle of volumetric analysis, alkalimetry, normality factor, basicity of base.

### Group C

Attempt only 2 questions. (2x10=20)

26. Define self indicator
    (i) Calculate the normality of the mixture containing 25CC of N/2 HCl solution, 5CC of 2N $H_2SO_4$ solution and 20CC of water.
    (ii) Define titrand and titrant. 2.014g of sample of chalk were dissolved in 50 ml of 1NHCl; the excess of unreacted acid is titrated with 1N NaOH, 10.7 ml being required. Calculate the% of $CaCO_3$ in the chalk.
27. Describe the laboratory preparation of pure nitrobenzene. Why does it give m-product during electrophilic substitution reactions? Convert it into o-nitro aniline.
28. Write short notes. (Only two) (2x5=10)
    a) Selection of indicator in acid base titration.
    b) General methods of preparation of benzene.
    c) Application of Solubility product principle and common ion effect in applied chemistry.

**"The End"**

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## ASSIGNMENT

Class: XII F.M-100
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Attempt all questions. Group "A" 15x2=30

1. How does catalyst alters the rate of a chemical reaction?
2. a) 2.6 g of sodium carbonate is added to 500 ml of 0.4N of hydrochloric acid solution. what is the normality of resulting solution
   b) 0.715g of $Na_2CO_3.xH_2O$ requires 20 ml of decinormal HCl for complete reaction. Find the value of x.
3. Define molar solution. What is the molarity of water if it has specific gravity one.
4. Define Lewis acid and base giving one example from each.
5. What are insecticide and antibiotics? Give examples.
6. Define addition and condensation polymers with suitable examples
7. A first order reaction was started with a decimolar solution of the reactant .After 6 minutes 40 seconds, its concentration was found to be centimolar. Determine the rate constant of the reaction.
8. Why does nitrobenzene undergo electrophilic substitution reaction in Meta position?
9. What are broad spectrum antibiotics? Give two examples of it.
10. Write any two general chemical reactions for the preparation of benzene.
11. What happen when?
    i. Benzene is heated with acetic anhydride in presence of anhydrous $AlCl_3$.
    ii. Sodium benzoate is heated with soda lime.
12. What volume of conc.HCl is required to neutralise 1lit.of 0.1M NaOH which have 38% by mass with density 1.19g/cc?
13. Define self indicator titration. Give example.
14. Define $p^H$ & pOH. Write relation between them.
15. Define degree of ionization and dissociation constant.

Attempt all questions. Group "B" 5x5=25

16. What is basicity of an acid? 10.375 gram of mixture of sodium chloride and sodium carbonate is dissolved in water and the volume is made upto 250 ml. 25 ml of this solution required 75.5 ml of decinormal of sulphuric acid. find the percentage composition of the mixture.
17. $A(g) + B(g) \rightarrow C(g) + D(g)$
    It is found that, rate= $K [A]^2 [B]^1$
    How many time does the rate of reaction increases or decreases if,
    a) The partial pressure of both A&B are doubled
    b) The partial pressure of A doubles but that of B remains constant
    c) The volume of reacting vessel is doubled
    d) An inert gas is added which doubles the overall pressure whilst the partial pressure of A is doubled and B remains constant.
    e) The temperature rises by $30^0$C.
18. Describe the Ostwald dilution law. Write its limitation. Calculate the degree of ionization of centimolar weak acid (HA) having dissociation constant $1.5 \times 10^{-5}$.Also find pH.
19. Describe one chemical method for the separation of mixture of $1^0$, $2^0$ & $3^0$ amines.
20. Describe with well labeled diagram, the lab preparation of organic compound obtained by nitration of benzene at $60^0$C.

Attempt all questions. Group "C" 2x10=20

21. a) Distinguish between order and molecularity of a reaction. A first order reaction is 75% complete in 60 minutes. Calculate the time reqired for 90% completion of same reaction. 5
    b) Which indicator would you use during the titration between HCl & $Na_2CO_3$, Why? Two acids A & B are titrated separately each time with 25 ml of 2N $Na_2CO_3$ & require 20ml and 100 ml respectively for complete neutralization. What volume of A & B would mix to prepare two litres of normol acid solution? (1.5+3.5=5)
22. i. How is pure aniline prepared in lab? (7+3=10)
    ii. Show your acquaintances with
    a) Coupling reaction
    b) Carbyl amine reaction
    c) Readuction of nitrobenzene in basic medium

**"The End"**

[REF]

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## ASSIGNMENT

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### Group "A" 15x2=30

1. An organic compound A on treating with ethyl magnesium bromide followed by acidic hydrolysis gives n-propyl alcohol, identify A with necessary chemical reactions.
2. How will you prove benzene is an aromatic compound according to Huckel's rule of aromaticity?
3. How can you explain bromobenzene is o,p-director towards electrophilic substitution reactions?
4. How will you prepare a) DDT b) chloretone?
5. Convert benzene to chlorobenzene.
6. How will you convert ethanol to propan-2-ol?
7. What are requisites for a substance to be primary standard?
8. 1gm of an ordinary sample of limestone dissolved in 16.6cc of 0.92N HCl leaving some sandy residue. Calculate the % of pure $CaCO_3$ in the sample.
9. Differentiate between end point and equivalence point.
10. Why ether is stored in brown bottle along with iron wire?
11. A first order reaction has a rate constant of $1.15 \times 10^{-3}\ s^{-1}$.How long will 5g of this reactant to reduce to 3g?
12. Define Bronsted –Lowry acid and base with example.
13. Differentiate between order and molecularity of reaction.
14. Give an example of antipyretic drug and analgesic drug with structure.
15. Why is the bond angle in water more than $H_2S$?

### Group "B" 5x5=25

16. Describe the lab preparation of compound obtained by heating bromoethane with silver oxide with neat and well labeled diagram and theory.
17. Define following reaction and give an example
    a. Iodoform reaction
    b. Reimer-Tiemann reaction
    c. Oxo process
    d. Esterification test
    e. Friedel-Craft acylation
18. Define normality factor.3.12gm of soda crystals ($Na_2CO_3.xH_2O$) were dissolved in 200 ml of water.20 ml of the resulting solution titrated with N/10 $H_2SO_4$ required 21.8 ml for exact neutralization .calculate the % of anhydrous $Na_2CO_3$ in the crystals and also the value of x.
19. Describe the choice of indicators for various acid base titrations.
20. State Ostwald dilution law. A saturated solution of $CaF_2$ contains 0.00168g solute per 100ml of solution at 25°C, Calculate Ksp of $CaF_2$($CaF_2$ =78).4+1

### Group "C" 2x10=20

21. Describe the lab preparation of trichloromethane. How does it react with a) Zn dust and water b) acetone c) Conc.$HNO_3$ d) Aq.KOH? (6+4)

Write short notes on (5+5)

a) Victor-Meyer's method to identify alcohols.
b) Application of common ion effect and solubility product in salt analysis.

**"The End"**

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## ASSIGNMENT

Class: XII F.M-100

Subject: Chemistry P.M.-40

### Group "A"

Attempt any fifteen questions. 15×2=30

1. Why does nitrobenzene undergo electrophilic substitution reaction in m-position?
2. Compare the boiling point of ethanol and ethoxy ethane.
3. Write the any three general methods of preparation of chlorobenzene.
4. Why is N, N-dimethyl amino methane less basic than N-methyl amino methane?
5. The $P^H$ of 0.1 M HCN solution is 5.2.What is value of $K_a$ for the acid.
6. Find the normality of resulting solution prepared by mixing 100ml of 1M$H_2SO_4$, 100ml of 1MNaOH and 100ml water.
7. An organic compound A having molecular mass 46 on heating with iodine in presence of aq. NaOH gave compound B. The compound B heated with silver give compound C. Compound C on passing through red hot iron tube gives aromatic hydrocarbon. Identify A, B and C.
8. Define Lewis acid and Bronsted Lowry base giving one example for each.
9. Convert a) benzene to DDT b) benzene to anisole.
10. Define pseudo molecular reaction with an example.
11. Show your acquaintances with: a. Decarbonylation reaction b. Reimer-Tiemann reaction
12. Complete the followings:
    a. $A \xrightarrow{NA/dry\,ether/\Delta}$ 2, 3- Dimethybutane.
    b. $Bromoethene \xrightarrow{KCN} A \xrightarrow{H_2O/H^+}$
13. Why aqueous solution of $CH_3COONH_4$ is nearly neutral but $(CH_3COO)_2Ca$ slightly basic?.
14. Calculate $_PH$ of $1\times10^{-7}$ M $HNO_3$?
15. What volume of 12M NaOH and 2M NaOH should be mixed to get 2 liters of 9M NaOH solution?
16. List the factors affecting the rate of chemical reaction.
17. Draw the energy profile diagram for exothermic reaction showing activation energy in presence and absence of positive catalyst.

### Group "B"

Attempt any five questions 5×5=25

18. Describe the laboratory preparation of trichloromethane. How does it react with acetone?
19. Describe the laboratory preparation of organic obtained by heating iodoethane with silver oxide. How does it react with conc.HCl at 0 °C? 4+1
20. Write the principle of volumetric analysis. A sample of chalk contained calcium sulphate as impurity. One gm of the solid chalk was allowed to be in contact with 230cc of N/10 HCl solution. The excess of acid in the mixture was completely neutralized by 8cc of 0.45N sodium hydroxide solution. Calculate the % of chalk in the sample.2+3
21. Complete the followings
    a) Aniline reacts with chloroform in KOH
    b) Anisole +Conc. $H_2SO_4$
    c) Phosgene + ethyl alcohol
    d) dimethyl amine + nitrous acid
    e) BDC + Cu/HCl
22. Write the isomers of $C_3H_9N$ with their IUPAC names. Also describe the suitable method of separation from their mixture. 1+4
23. Write the reduction product of nitrobenzene in different medium.
24. The following rate data were obtained at 303 K for the reaction $2A + B_2 \rightarrow C + D$

| Expt. No | [A] mol $lit^{-1}$ | [$B_2$] mol $lit^{-1}$ | Initial rate, mol $litre^{-1}$ $s^{-1}$ |
|---|---|---|---|
| 1. | 0.1 | 0.1 | $6\times10^{-3}$ |
| 2. | 0.3 | 0.2 | $7.2\times10^{-2}$ |
| 3. | 0.3 | 0.4 | $2.88\times10^{-1}$ |
| 4. | 0.4 | 0.1 | $2.4\times10^{-2}$ |

What is the rate law? What is the order with respect to each reactant and overall order? Calculate value of K.

### Group "C"

Attempt any two questions 2×10=20

25. a) Write relation between normality and molarity.25cc of NaOH solution neutralize exactly 5cc of solution(containing 1.4175gm in 250ml)of a dibasic acid having molecular weight 126.It has been found that 10cc of the same NaOH solution neutralize exactly 8cc of $H_2SO_4$ solution. Find the normality of $H_2SO_4$. 2+3
    b) Show that degree of ionization of weak electrolyte is proportional to the square root of its dilution. 2
    c) Define ionic product of water and how does it vary with temperature? 3
26. a) How is pure aniline prepared in laboratory? 6
    b) How do you select various pH indicators for acid and base titrations? 4
27. a) Write the structure of organic compound A, B, C, D and E in the following reaction.

$$A \xrightarrow{HNO_3/H_2SO_4} B \xrightarrow{SN/HCL,\Delta} C \xrightarrow{CHCL_3KOH\Delta} D \xrightarrow{LiAlH_4} E$$

The compound A on ozonolysis gives glyoxal. 5

b) Define first order reaction. A first order reaction has a rate constant of $1.15\times10^{-3}\ s^{-1}$ .How long will 5g of this reactant to reduce to 3g? [2 +3]

**"The End"**