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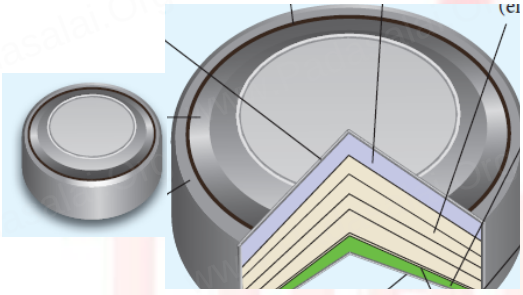
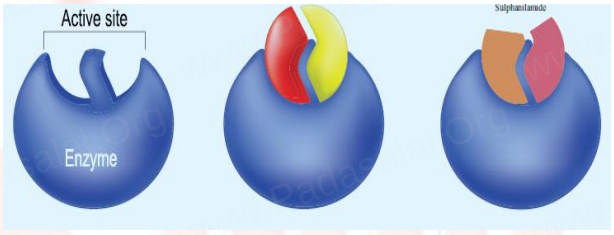
XII - Chemistry

Volume - II

UNITWISE

EVALUATION AND ADDITIONAL QUESTIONS





8. IONIC EQUILIBRIUM

EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

1. What are Lewis acids and bases? Give two example for each (Vol - II, Page No : 4)
2. Discuss the Lowery - Bronsted concept of acids and bases (3)
3. Identify the conjugate acid, base pair of the following reaction in aqueous solution (Creative)

   i) $HS^-(aq) + HF \rightleftharpoons F^-(aq) + H_2S(aq)$ ii) $HPO_4^{2-} + SO_3^{2-} \rightleftharpoons PO_4^{3-} + HSO_3^-$

   iii) $NH_4^+ + CO_3^{2-} \rightleftharpoons NH_3 + HCO_3^-$
4. Account for the acidic nature of $HClO_4$. In terms of Bronsted - Lowry theory, identify its conjugate base (Creative)
5. When aqueous ammonia is added to $CuSO_4$ solution, the solution turns deep blue due to the formation of tetraamminecopper (II) complex, among H_2O and NH_3 which is stronger Lewis base. (Creative)

   $$[Cu(H_2O)_4]^{2+}_{(aq)} + 4NH_3(aq) \rightleftharpoons [Cu(NH_3)_4]^{2+}_{(aq)}$$
6. The concentration of hydroxide ion in water sample is found to be 2.5×10^{-6} M. Identify the nature of the solution (Creative)
7. A Lab assistant prepared a solution by adding a calculated quantity of HCl gas 25 ° C to get a solution with $[H_3O^+] = 4 \times 10^{-5}$ M . Is the solution neutral or acidic or basic? (Creative)
8. Calculate the pH of 0.04 M HNO_3 solution (Creative)
9. Define solubility product (25)
10. Define ionic product of water. Give its value at room temperature (7)
11. Explain common Ion effect with an example (15)
12. Define p^H (9)
13. Calculate the pH of 1.5×10^{-3} M solution of $Ba(OH)_2$ (Creative)
14. The Ka value for HCN is 10^{-9}. What is the pH of 0.4 M HCN solution? (Creative)
15. Calculate the extent of hydrolysis and the pH of 0.1M ammonium acetate given that $k_a = k_b = 1.8 \times 10^{-5}$. (Creative)

16. Solubility product of Ag_2CrO_4 is $1x10^{-12}$. What is the solubility of Ag_2CrO_4 in 0.01M $AgNO_3$ solution? (Creative)
17. Write the expression for the solubility product of $Ca_3(PO_4)_2$ (Creative)
18. A saturated solution, prepared by dissolving $CaF_{2\ (s)}$ in water, has $[Ca^{2+}] = 3.3 \times 10^{-4}$ M what is the K_{sp} of CaF_2? (Creative)
19. K_{sp} of AgCl is 1.8×10^{-10}. Calculate molar solubility in 1M $AgNO_3$ (Creative)
20. A particular saturated solution of silver chromate Ag_2CrO_4 has $[Ag] = 5 \times 10^{-5}$ and $[CrO_4]^{2-} = 4.4 \times 10^{-4}$ M. what is the value of K_{sp} for Ag_2CrO_4? (Creative)
21. Write the expression for the solubility product of Hg_2Cl_2 (Creative)
22. K_{sp} of Ag_2CrO_4 is 1.1×10^{-12}. What is the solubility of Ag_2CrO_4 in 0.1M K_2CrO_4 ? (Creative)
23. K_{sp} of $Al(OH)_3$ is 1×10^{-15} M. At what pH does 1.0×10^{-3} M, Al^{3+} precipitate on the addition of buffer of NH_4Cl and NH_4OH solution? (Creative)

Answer the following questions in detail : (5 Marks)

1. Derive an expression for Ostwald's dilution law (12,13)
2. 50 ml of 0.05M HNO_3 is added to 50 ml of 0.025M KOH. Calculate the pH of the resultant solution (Creative)
3. Derive an expression for the hydrolysis constant and degree of hydrolysis of salt of strong acid and weak base. (22,23)
4. Will a precipitate be formed when 0.150 L of 0.1 M $Pb(NO_3)_2$ and 0.100 L of 0.2 M NaCl are mixed ? K_{sp} ($PbCl_2$) = 1.2×10^{-5} (Creative)

ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. Mention the Arrhenius concept of acid and base (2)
2. What are the limitations of Arrhenius concepts? (3)
3. Differentiate Lewis acids and Lewis bases (5)
4. How will you measure the strength of an acid? (6)
5. What are buffer solutions? Mention its types (15)

6. What is buffer index? (18)
7. How will you calculate solubility product from molar solubility? (26)
8. Give a condition for a compound to be precipitated (25)

Answer the following questions in detail : (5 Marks)

1. Derive the relationship between P^H and P^{OH} (9)
2. Explain the buffer action of a solution (16)
3. Derive Henderson-Hasselbalch equation (18)
4. Derive a relationship between the equilibrium constant and the dissociation constant for the salt of strong base and weak acid. (21,22)

9. ELECTROCHEMISTRY

EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

1. Define anode and cathode (45)
2. Why does conductivity of a solution decrease of dilution of the solution ? (Creative)
3. State Faraday's Laws of electrolysis (54)
4. Why is anode in galvanic cell considered to be negative and cathode positive electrode? (45)
5. Which of 0.1M HCl and 0.1 M KCl do you expect to have greater Λ°_m and why? (Creative)
6. Arrange the following solutions in the decreasing order of specific conductance. (Creative)

   i) 0.01 M KCl ii) 0.005 M KCl iii) 0.1 M KCl iv) 0.25 M KCl v) 0.5 M KCl

7. Why is AC current used instead of DC in measuring the electrolytic conductance? (38)
8. 0.1M NaCl solution is placed in two different cells having cell constant 0.5 and 0.25cm^{-1} respectively. Which of the two will have greater value of specific conductance? (Creative)
9. Can Fe^{3+} oxidises bromide to bromine under standard conditions? (Creative)

   Given: $E^\circ_{Fe3+|\ Fe2+} = 0.771$ $E^\circ_{Br2|\ Br-} = 1.09$ V
10. Is it possible to store copper sulphate in an iron vessel for a long time? (Creative)

    Given : $E^\circ_{Cu2+|\ Cu} = 0.34$V and $E^\circ_{Fe2+|\ Fe} = -0.44$ V

11. Two metals M_1 and M_2 have reduction potential values of -xV and +yV respectively. Which will liberate H_2 and H_2SO_4? (Creative)
12. Reduction potential of two metals M_1 and M_2 are $E°_{M_1^{2+}|M_1} = -2.3V$ and $E°_{M_1^{2+}|M_2} = 0.2V$
    Predict which one is better for coating the surface of iron. Given : $E°_{Fe2+|\ Fe} = -0.44$ V
    (Creative)
13. Calculate the standard emf of the cell: Cd| Cd^{2+} || Cu^{2+}| Cu and determine the cell reaction. The standard reduction potentials of Cu^{2+}| Cu and Cd| Cd^{2+} are 0.34V and -0.40 volts respectively. Predict the feasibility of the cell reaction. (Creative)
14. The same amount of electricity was passed through two separate electrolytic cells containing solutions of nickel nitrate and chromium nitrate respectively. If 2.935g of Ni was deposited in the first cell. The amount of Cr deposited in the another cell? (Creative)
    Give : molar mass of Nickel and chromium are 58.74 and 52gm^{-1} respectively.
15. A copper electrode is dipped in 0.1M copper sulphate solution at 25°C . Calculate the electrode potential of copper. [Given: $E°_{Cu2+|\ Cu} = 0.34$] (Creative)
16. Write a note on sacrificial protection. (61)
17. Ionic conductance at infinite dilution of Al^{3+} and SO_4^{2-} are 189 and 160 mho cm^2 $equiv^{-1}$. Calculate the equivalent and molar conductance of the electrolyte $Al_2(SO_4)_3$ at infinite dilution. (Creative)

Answer the following questions in detail : (5 Marks)

1. State Kohlrausch Law. How is it useful to determine the molar conductivity of weak electrolyte at infinite dilution (41,42)
2. Describe the electrolysis of molten NaCl using inert electrodes (53)
3. Describe the construction of Daniel cell. Write the cell reaction (44)
4. The conductivity of a 0.01M solution of a 1:1 weak electrolyte at 298 K is 1.5 x 10^{-4} Scm^{-1}
   i) Molar conductivity of the solution
   ii) Degree of dissociation and the dissociation constant of the weak electrolyte given that
   $\lambda°_{cation} = 248.2$ S cm^2 mol^{-1} $\lambda°_{anion} = 51.8$ Scm^2 mol^{-1} (Creative)

5. A current of 1.608 A is passed through 250 ml of 0.5M solution of copper sulphate for 50 Minutes. Calculate the strength of Cu^{2+} after electrolysis assuming volume to be constant and the current efficiency is 100% (Creative)
6. In fuel cell H_2 and O_2 react to produce electricity. In the process, H_2 gas is oxidised at the anode and O_2 at cathode. If 44.8 litre of H_2 at 25°C and 1atm pressure reacts in 10 minutes, what is average current produced? If the entire current is used for electro deposition of Cu from Cu^{2+} , how many grams of Cu deposited? (Creative)
7. For the cell Mg (s)| Mg^{2+}(aq) || Ag^{+} (aq) Ag (s), calculate the equilibrium constant at 25°C and maximum work that can be obtained during operation of cell.
   Given : $E°_{Mg2+|\ Mg} = -2.37$ V and $E°_{Ag2+|\ Ag} = 0.80$ V (Creative)
8. 8.2×10^{12} litres of water is available in a lake. A power reactor using the electrolysis of water in the lake produces electricity at the rate of 2×10^{6} Cs^{-1} at an appropriate voltage. How many years would it like to completely electrolyze the water in the lake. Assume that there is no loss of water except due to electrolysis. (Creative)
9. Derive an expression for Nernst equation (51)
10. Explain the function of H_2 - O_2 fuel cell. (59)

ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. What is conductivity cell? (34)
2. State ohm's law (34)
3. What is specific resistance? Mention its unit (35)
4. What is specific conductance? Mention its unit (35)
5. Define Molar conductance. Give its unit (36)
6. Define equivalent conductance (36)
7. What are the factors affecting electrolytic conductance? (38,39)
8. Calculate the molar conductance at infinite dilution of a weak electrolyte (42)
9. Calculate the degree of dissociation of weak electrolytes (42)

10. Calculate the solubility of sparingly soluble salts (43)
11. Write the cell reaction of Galvanic cell (44)
12. What is Standard Hydrogen Electrode? (48)
13. Define electrode potential and standard electrode potential (49)
14. Mention the electrochemical mechanism of corrosion (60)
15. What are electrochemical series? (62)
16. Explain the function of a salt bridge in an electrochemical cell (46)
17. What is intercalation? (59)
18. Define electrochemical equivalent (54)

Answer the following questions briefly: (5 Marks)

1. How is the conductivity of an electrolytic solution is determined by using a wheatstone bridge arrangement? (38)
2. Explain the relationship between free energy of the cell and its emf (50)
3. Explain the cell reaction of Leclanche cell with a neat diagram (56)
4. Explain the cell reaction of Lead storage battery (58)
5. Explain the process of recharging of lead storage battery (58)
6. Explain the function of mercury button cell (57)
7. Explain the function of lithium ion battery (58)

10. SURFACE CHEMISTRY

EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

1. Give two important characteristics of physisorption (71)
2. In case of chemisorptions, why adsorption first increases and then decreases with temperature? (73)
3. Which will be adsorbed more readily on the surface of charcoal and why? NH_3 or CO_2?

4. Heat of adsorption is greater for chemisorptions than physisorption. Why? (Creative)
5. In a coagulation experiment 10ml of a colloid (X) is mixed with distilled water and 0.1M solution of an electrolyte AB so that the volume is 20ml. It was found that all solutions containing more than 6.6ml of AB coagulate with in 5 minutes. What is the flocculation values of AB for sol (X)? (Creative)
6. Peptizing agent is added to convert precipitate into colloidal solution. Explain with an example (90)
7. What happens when a colloidal sol of $Fe(OH)_3$ and As_2O_3 are mixed? (Creative)
8. Why are lyophillic colloidal sols are more stable than lyophobic colloidal sol? (87)
9. Addition of alum purifies water. Why? (Creative)
10. What are factors which influence the adsorption of a gas on a solid? (72)
11. What are enzymes? Write a brief note on the mechanism of enzyme catalysis (83)
12. What do you mean by activity and selectivity of catalyst? (25)
13. Give three uses of emulsions (Creative)
14. Why does bleeding stop by rubbing moist alum? (Creative)
15. Why is desorption important for a substance but it is a state of substance? (Creative)
16. Comment on the statement: Colloid is not a substance but it is a state of substance (Creative)
17. Explain any one method for coagulation (96)
18. Write a note on electro osmosis (95)
19. Write a note on catalytic poison (79)
20. Explain intermediate compound formation theory of catalysis with an example (80)
21. What is the difference between homogenous and heterogeneous catalysis? (77)
22. Describe adsorption theory of catalysis (81)

Answer the following questions in detail : (5 Marks)

1. Differentiate physisorption and chemisorptions (71)
2. What is the difference between a sol and a gel? (84)
3. Describe some feature of catalysis by zeolites (84)

ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. What are the characteristics of adsorption? (71)
2. What ate the factors affecting adsorption? (72)
3. Write about Freundlich adsorption isotherm (74)
4. What is the use of adsorption in the softening of hard water? (75)
5. Define chromatography (75)
6. What are the characteristics of catalysis? (78)
7. Define promoters and catalytic poison with suitable example (79)
8. Define auto catalyst (79)
9. Define negative catalyst (79)
10. What are active centres? (82)
11. Write about phase transfer catalysis (85)
12. Define nano catalysis (86)
13. What are lyophilic and lyophobic colloids? (87)
14. Define peptisation (90)
15. What is electro dispersion? (89)
16. Define electro dialysis (91)
17. What is ultra filtration? (91)
18. What is Tyndall effect? (93)
19. What is Brownian movement? Mention its applications (93)
20. Define Helmholtz double layer (94)
21. How can we determine the charge of the sol particles? (94)
22. Write about electro osmosis (95)
23. Define coagulation and mention its various methods (96)
24. What are emulsions ? mention its types (97)
25. Define gold number (96)
26. How will you identify the types of emulsion? (97)

27. What are the various deemulsification techniques ? (97)

Answer the following questions in detail : (5 Marks)

1. Explain the general characteristics of enzyme catalysis (83)
2. How will you prepare a colloid by dispersion methods? (88)
3. Explain the preparation of colloids by condensation methods. (90)

11. HYDROXY COMPOUNDS AND ETHERS

EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

1. Identify the product (s) is / are formed when 1 – methoxy propane is heated with excess HI. Name the mechanism involved in the reaction (Creative)
2. Draw the major product formed when 1-ethoxyprop-1-ene is heated with one equivalent of HI (Creative)
3. Suggest a suitable reagent to prepare secondary alcohol with identical group using Grignard reagent. (108)
4. What is the major product obtained when two moles of ethyl magnesium bromide is treated with methyl benzoate followed by acid hydrolysis? (Creative)
5. Arrange the following in the increasing order of their boiling point and give a reason for your ordering (i.) Butan – 2- ol, Butan -1-ol, 2 –methylpropan -2-ol
   (ii.) Propan -1-ol, propan -1,2,3-triol, propan -1,3 – diol, propan -2-ol (Creative)
6. Can we use nucelophiles such as NH_3 ,CH_3O^- for the Nucleophilic substitution of alcohols? (Creative)
7. Is it possible to oxidise t – butyl alcohol using acidified dichromate to form a carbonyl compound? (Creative)
8. What happens when 1-penyl ethanol is treated with acidified $KMnO_4$? (Creative)
9.. Write the mechanism of acid catalysed dehydration of ethanol to give ethane. (115)

10. Explain Kolbe's reaction (130)

11. Writes the chemical equation for Williamson synthesis of 2-ethoxy – 2- methyl pentane starting from ethanol and 2 – methyl pentan -2-ol (Creative)

12. Write the structure of the aldehyde, carboxylic acid and ester that yield 4- methylpent -2-en-1-ol. (Creative)

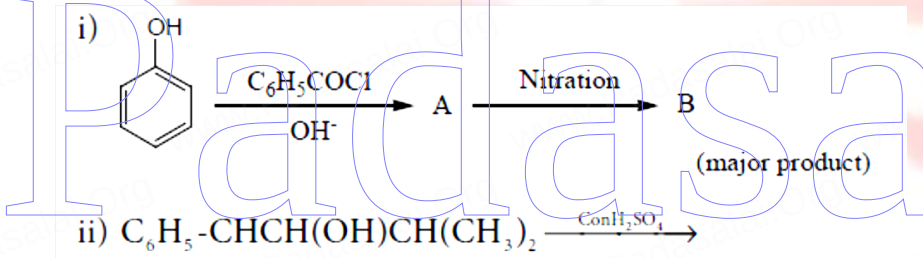
13. What is metamerism? Give the structure and IUPAC name of metamers of 2-methyoxy propane (Creative)

14. How are the following conversions effected

i) benzylchloride to benzylalcohol ii) benzyalalcohol to benzoic acid (Creative)

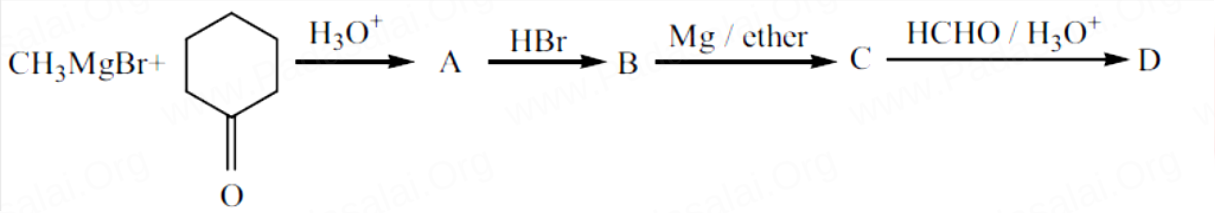
15. 0.44g of a monohydric alcohol when added to methyl magnesium iodide in ether liberates at STP 112 cm^3 of methane with PCC the same alcohol form a carbonyl compound that answers silver mirror test. Identify the compound. (Creative)

16. Complete the following reactions (Creative)

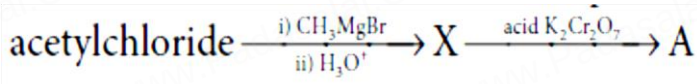


17. Phenol is distilled with Zn dust followed by Friedel – crafts alkylation with propyl chloride to give a compound B, B on oxidation gives (c) Indentify A,B and C. (Creative)

18. Identify A,B,C,D and write the complete equation (Creative)



19. What will be the product X and A for the following reaction? (Creative)



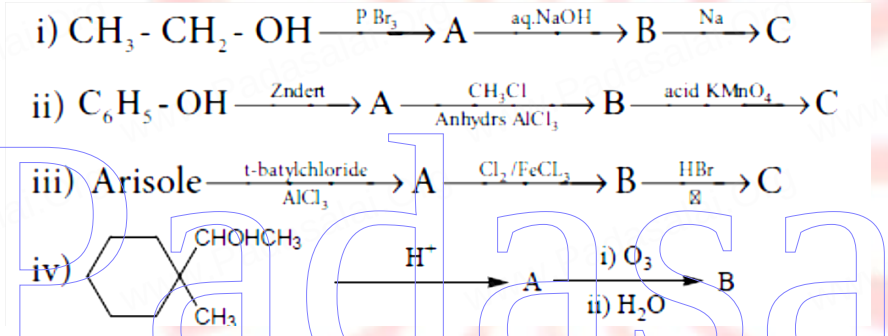
Identify X and A

20. How will you convert acetylene into n-butyl alcohol? (Creative)

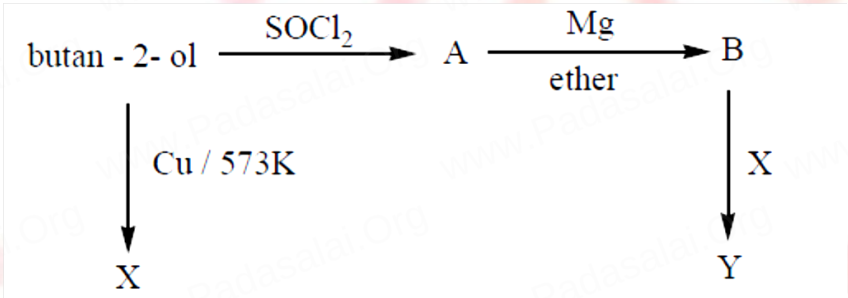
21. 3,3 – dimethylbutan -2-ol on treatment with conc.H_2SO_4 to give tetramethyl ethylene as a major product. Suggest a suitable mechanism (Creative)

Answer the following questions in detail : (5 Marks)

1. Predict the major product, when 2-methyl but -2-ene is converted into an alcohol in each of the following methods. (i.) Acid catalysed hydration (ii.) Hydroboration (109) (iii.) Hydroxylation using bayers reagent (Creative)
2. How is phenol prepared from (Creative)
   i) chloro benzene (126) ii) iso propyl benzene (126)
3. Complete the following reactions (Creative)



4. Predict the product A,B,X and Y in the following sequence of reaction (Creative)



ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. How does ethane react with $KMnO_4$? (110)
2. How does methanol react with thionyl chloride? (114)
3. Explain the dehydration of tertiary alcohol by E1 mechanism (115)
4. Explain Saytzeff's rule (116)
5. Swern oxidation (117)
6. How does 1°, 2°, 3° alcohol react with Cu at 573 K? (118)
7. How is oxirane prepared by ethane 1,2 diol? (119)
8. How will you prepare 1,4 dioxane? (120)
9. How is nitroglycerine prepared? (121)
10. How will you prepare acrolein? (121)
11. Mention the uses of glycol (122)
12. Note on Dow's process (126)
13. How will you prepare phenol from benzene? (126)
14. Note on Schotten-Baumann reaction (127)
15. Note on Willamson ether synthesis (127)
16. How does phenol react with acidified $K_2Cr_2O_7$? (128)
17. How will you prepare cyclohexanol from phenol? (128)
18. How will you prepare picric acid? (129)
19. How will you prepare 2,4,6 tribromo phenol? (130)
20. Riemer – Tiemann reaction (130)
21. Phthalein reaction (131)
22. Cupling reaction (131)
23. Test to differentiate alcohol and phenol (131)
24. How does ether react with HI ? Explain with mechanism (137)
25. What is autooxidation? (137)
26. Friedel craft's reaction (138)

Answer the following questions briefly: (5 Marks)

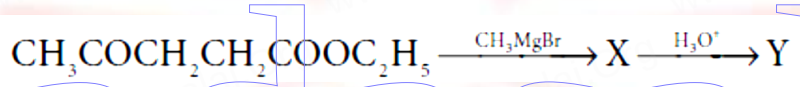
1. Lucas Test (110)
2. Victor Meyer's Test (111)
3. How does primary alcohol reacts with alkyl halides? Explain with mechanism. (113)
4. How does Tertiary alcohol reacts with alkyl halides? Explain with mechanism (114)
5. How will you prepare diethyl ether? (134)

12. CARBONYL COMPOUNDS

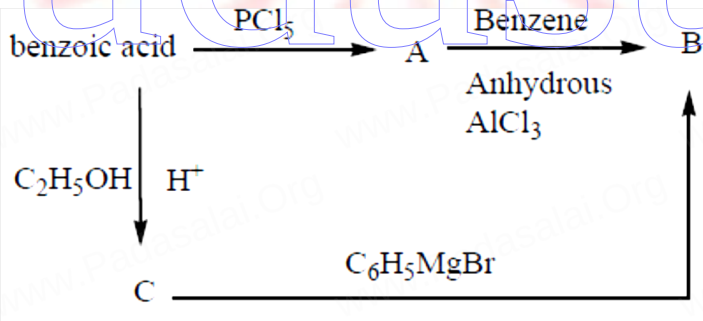
EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

1. Identify X and Y. (Creative)



2. Identify A, B and C (Creative)

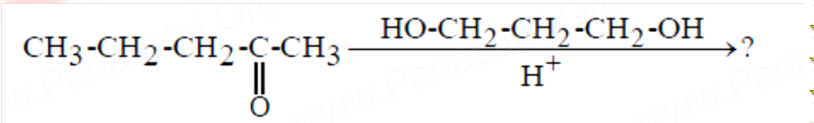


3. A hydrocarbon A(molecular formula C_8H_{10}) on ozonolysis gives B($C_4H_6O_2$) only. Compound C(C_3H_5Br) on treatment with magnesium in dry ether gives (D) which on treatment with CO_2 followed by acidification gives(C). Identify A, B and C. (Creative)
4. How will you convert benzaldehyde into the following compounds? (Creative)
   (i) benzophenone (ii) benzoic acid (iii) α hydroxyphenylaceticacid.
5. What is the action of HCN on (i) propanone (ii) 2,4-dichlorobenzaldehyde iii) ethanol (Creative)

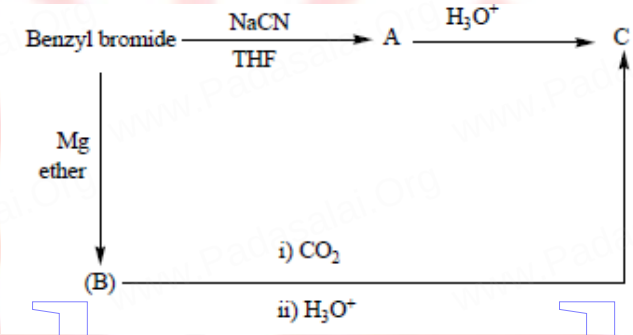
6. A carbonyl compound A having molecular formula $C_5H_{10}O$ forms crystalline precipitate with sodium bisulphate and gives positive iodoform test. A does not reduce Fehling solution. Identify A. (Creative)

7. Write the structure of the major product of the aldol condensation of benzaldehyde with acetone. (163)

8. Complete the following reaction. (Creative)



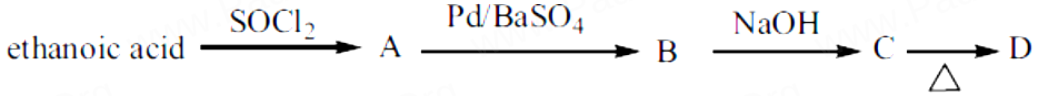
9. Identify A, B and C (Creative)



10. Oxidation of ketones involves carbon – carbon bond cleavage. Name the product (s) is / are formed on oxidising 2,5 – dimethyhexan – 2- one using strong oxidising agent. (Creative)

Answer the following questions in detail : (5 Marks)

1. How is propanoic acid is prepared starting from? (Creative)
   (a) an alcohol (b) an alkylhalide (c) an alkene
2. A Compound (A) with molecular formula C_2H_3N on acid hydrolysis gives(B) which reacts with thionylchloride to give compound(C). Benzene reacts with compound (C) in presence of anhydrous $AlCl_3$ to give compound(C). Compound (C) on reduction with gives (D). Identify (A), (B), (C) and D. Write the equations. (Creative)
3. Identify A, B, C and D (Creative)



4. An alkene (A) on ozonolysis gives propanone and aldehyde (B). When (B) is oxidised (C) is obtained. (C) is treated with Br2/P gives (D) which on hydrolysis gives (E). When propanone is treated with HCN followed by hydrolysis gives (E). Identify A, B, C, D and E. (Creative)
5. How are the following conversions effected (Creative)
   (a) propanal into butanone (b) Hex-3-yne into hexan-3-one.
   (c) phenylmethanal into benzoic acid (d) phenylmethanal into benzoin (164)
6. How will you prepare (Creative)
   i. Acetic anhydride from acetic acid (175)
   ii. Ethylacetate from methylacetate
   iii. Acetamide from methylcyanide (187)
   iv. Lactic acid from ethanal
   v. Acetophenone fromacetylchloride (153)
   vi. Ethane from sodium acetate (175)
   vii. Benzoic acid from toluene (171)
   viii. Malachitegreen from benzaldehyde (165)
   ix. Cinnamic acid from benzaldehyde (165)
   x. Acetaldehyde from ethyne (149)

ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. How will you prepare ethanol by ozonolysis? (149)
2. Rosenmund reduction (151)
3. Stephen's reaction (151)
4. Etard reaction (151)
5. Gattermann Koch reaction (151)
6. Friedel crafts acylation (151)
7. How is benzaldehyde manufactured commercially? (152)
8. How will you prepare aldimine? (158)
9. Urotropine and uses (158)
10. Popoff's rule (159)

11. Clemmensen reduction (160)
12. Wolf kishner reduction (161)
13. Haloform reaction (161)
14. Crossed aldol condensation (162)
15. What happens on heating of aldol? (161)
16. Claisen Schmidt condensation (163)
17. Crossed cannizaro reaction (164)
18. Perkin's reaction (165)
19. Knoevenagal reaction (165)
20. Note on Schiff's base (165)
21. Uses of formaldehyde and acetone (167)
22. How does sodium salt react with soda lime? (175)
23. HVZ reaction (176)
24. Reducing nature of formic acid (177)
25. Trans esterification (185)
26. Ammonolysis (185)
27. Claisen condensation (186)
28. Haffmann's degradation (188)

Answer the following questions briefly: (5 Marks)

1. How does acetone reacts with hydroxylamine, hydrazine, phenyl hydrazine? (152)
2. Explain Aldol condensation with mechanism (161)
3. Explain Cannizaro reaction with mechanism (163)
4. Test for aldehyde (166)
5. Esterification reaction with mechanism (173)

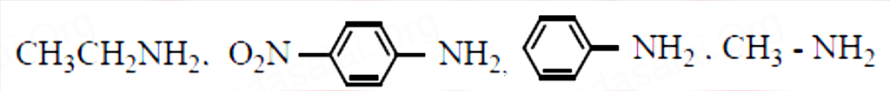
13. ORGANIC NITROGEN COMPOUNDS

EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

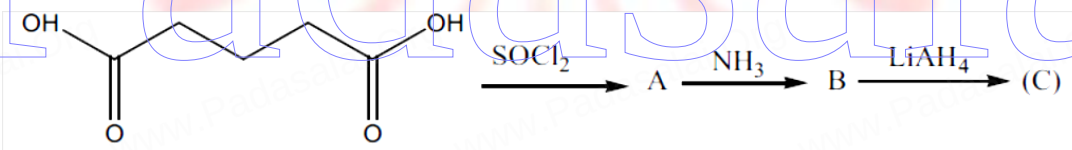
1. Write down the possible isomers of the $C_4 H_9 NO_2$ give their IUPAC names (Creative)
2. There are two isomers with the formula CH_3NO_2 . How will you distinguish between them? (Creative)
3. How will you prepare propan – 1- amine from (Creative)

   i) butane nitrile ii) propanamide ii) 1- nitropropane
4. Identify A,B,C and D (Creative)

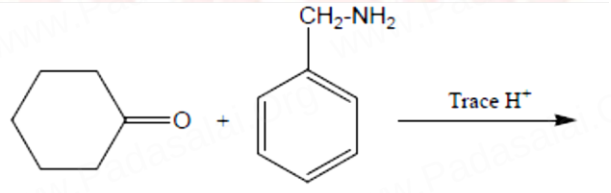


5. How will you convert diethylamine into (Creative)

   i) N, N – diethylacetamide ii) N – nitrosodiethylamine
6. Indentify A,B and C (Creative)



7. Indentify A,B,C and D Aniline + benzaldehyde → A $\xrightarrow{Con\ HNO3}$ C + D (Creative)
8. Complete the following reaction (Creative)

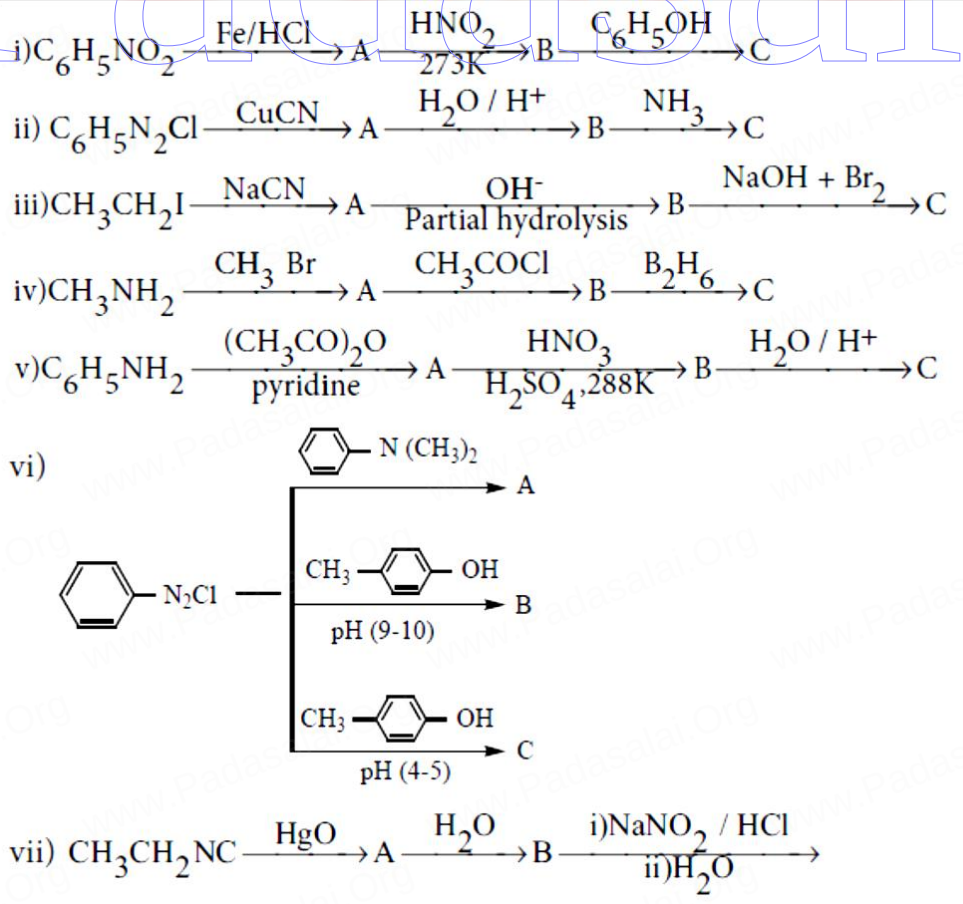


Answer the following questions in detail : (5 Marks)

1. What happens when (Creative)
   - i) 2 – Nitropropane boiled with HCl
   - ii) Nitrobenzene undergo electrolytic-reduction in strongly acidic medium
   - iii) Oxidation of tert – butylamine with $KMnO_4$
   - iv) Oxidation of acetoneoxime with triffluoroperoxy acetic acid.

2. How will you convert nitrobenzene into (Creative)
   - i. 1,3,5 - trinitrobenzene (204)
   - ii. o and p- nitrophenol
   - iii. m – nitro aniline (204)
   - iv. azoxybenzene
   - v. hydrozobenzene
   - vi. N – phenylhydroxylamine (203)
   - vii. aniline (203)

3. Identify compounds A,B and C in the following sequence of reactions. (Creative)



4. Write short notes on the following

i. Hofmann's bromide reaction (209)

ii. Ammonolysis (Creative)

iii. Gabriel phthalimide synthesis (209)

iv. Schotten – Baumann reaction (214)

v. Carbylamine reaction (216)

vi. Mustard oil reaction (216)

vii. Coupling reaction (222)

viii. Diazotisation (Creative)

ix. Gomberg reaction (221)

5. How will you distinguish between primary secondary and tertiary alphatic amines? (Creative)

6. Account for the following (Creative)

i. Aniline does not undergo Friedel – Crafts reaction

ii. Diazonium salts of aromatic amines are more stable than those of aliphatic amines

iii. pK_b of aniline is more than that of methylamine

iv. Gabriel phthalimide synthesis is preferred for synthesising primary amines.

v. Ethylamine is soluble in water whereas aniline is not

vi. Amines are more basic than amides

vii. Although amino group is o – and p – directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m – nitroaniline.

7. Arrange the following (Creative)

i. In increasing order of solubility in water, $C_6H_5NH_2$,$(C_2H_5)_2NH$, $C_2H_5NH_2$

ii. In increasing order of basic strength

a) aniline, p- toludine and p – nitroaniline

b) $C_6H_5NH_2$, $C_6H_5NHCH_3$, $C_6H_5NH_2$, p-Cl-C_6H_4 –NH_2

iii. In decreasing order of basic strength in gas phase

$C_2H_5NH_2$, C_2H_5NH, $(C_2H_5)_3N$, NH_3

iv. In increasing order of boiling point

C_6H_5OH, $(CH_3)_2NH$, $C_2H_5NH_2$

v. In decreasing order of the pKb values

$C_2H_5NH_2$, $C_6H_5NHCH_3$,$(C_2H_5)_2NH$ and CH_3 NH_2

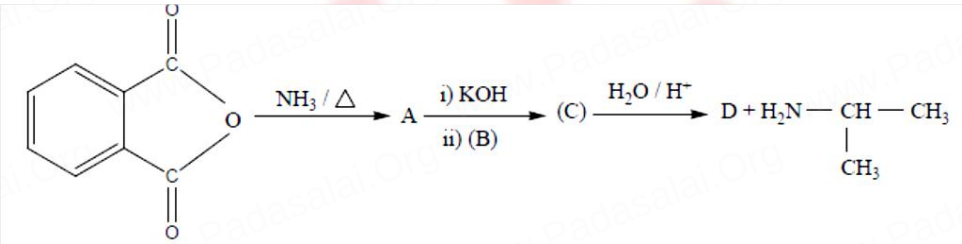
vi. Increasing order of basic strength

$C_6H_5NH_2$, $C_6H_5N(CH_3)_2$, $(C_2H_5)_2NH$ and $CH_3\ NH_2$

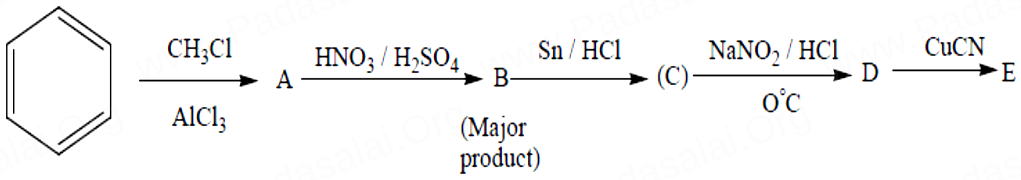
vii. In decreasing order of basic strength

$CH_3CH_2NH_2$, O_2N- C_6H_5-NH_2, $C_6H_5NH_2$, $CH_3\ NH_2$

8. Predict A,B,C and D for the following reaction (Creative)



9. A dibromo derivative (A) on treatment with KCN followed by acid hydrolysis and heating gives a monobasic acid (B) along with liberation of CO_2 . (B) on heating with liquid ammonia followed by treating with Br /KOH gives (c) which on treating with $NaNO_2$ and HCl at low temperature followed by oxidation gives a monobasic acid (D) having molecular mass 74. Identify A to D. (Creative)
10. Indentify A to E in the following frequency of reactions. (Creative)



ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. Tautomerism (199)
2. How will you prepare oil of mirbane? (201)
3. Chloropicrin (203)
4. Hoffmann's ammonolysis (209)
5. Sabatier – Mailhe method (210)

6. How will you prepare phenyl mustard oil? (216)
7. How does aniline react with Br2? (217)
8. Sandmeyer reaction (220)
9. Gattermann reaction (220)
10. Baltz – Schiemann reaction (221)

Answer the following questions briefly: (5 Marks)

1. Explain the reaction of $C_6H_5NO_2$ in acid, neutral, alkaline medium. (203)

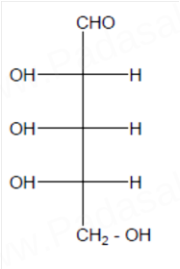
14. BIOMOLECULES

EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

1. What type of linkages hold together monomers of DNA? (Creative)
2. Give the differences between primary and secondary structure of proteins (254)
3. Name the vitamins whose deficiency cause i) rickets ii) scurvy (260)
4. Write the Zwitter ion structure of alanine (Creative)
5. Write a short note on peptide bond (252)
6. Give two difference between Hormones and vitamins (Creative)
7. Write a note on denaturation of proteins (256)
8. What are reducing and non reducing sugars? (Creative)
9. Why carbohydrates are generally optically active? (Creative)
10. Classify the following into monosaccharides, oligosaccharides and polysaccharides (Creative)
    i) Starch ii) fructose iii) sucrose iv) lactose v) maltose
11. How are vitamins classified? (258)
12. What are hormones? Give examples (266)
13. Write the structure of all possible dipeptides which can be obtained form glycine and alanine (253)

14. Define enzymes (257)
15. Write the structure of α – D (+) glucophyranose (Creative)
16. What are different types of RNA which are found in cell? (264)
17. What are the functions of lipids in living organism? (258)
18. Is the following sugar, D-sugar or L-sugar? (Creative)



Answer the following questions in detail : (5 Marks)

1. Give any three difference between DNA and RNA (264)
2. Write a note on formation of α helix (254)

ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. Outline the classification of carbohydrates giving example for each (239)
2. Write about the structure of sucrose (247)
3. What are starch and cellulose? (248,249)
4. Define isoelectric point (252)
5. What is zwitter ion? (252)
6. What is denaturation of proteins? (256)
7. Explain the mechanism of enzyme actions (257)
8. Mention the biological importance of lipids (256)
9. What are hormones? How are they classified? (266,267)

Answer the following questions briefly: (5 Marks)

1. Elucidate the structure of glucose (241)
2. Explain the cyclic structure of glucose (243)
3. Elucidate the structure of fructose (244)
4. Explain the structure of lactose and maltose (247,248)

5. Explain the secondary structure of proteins (247)
6. Explain the double strand helix structure of DNA. (262)
7. Explain the method of DNA finger printing (265)

15. CHEMISTRY IN EVERYDAY LIFE

EVALUATION :

Answer the following questions briefly: (2 or 3 Marks)

1. Which chemical is responsible for the antiseptic properties of dettol? (Creative)
2. What are antibiotics? (Creative)
3. Name one substance which can act as both analgesic and antipyretic (Creative)
4. Write a note on synthetic detergents (285)
5. How do antiseptics differ from disinfectants? (Creative)
6. What are food preservatives? (283)
7. Who do soaps not work in hard water? (Creative)
8. What are drugs? How are they classified? (273)
9. How the tranquilizers work in body? (Creative)
10. Write the structural formula of aspirin (Creative)
11. Which sweetening agent are used to prepare sweets for a diabetic patient? (283)
12. What are narcotic and non narcotic drugs? Give examples (278)
13. What are anti fertility drugs? Give examples (Creative)
14. Write a note on co polymer (291)
15. What are bio degradable polymers? Give examples (293)
16. How is terylene prepared? (289)
17. Write a note on vulcanization rubber (292)
18. Classify the following as linear, branched or cross linked polymers

    a) Bakelite b) Nylon c) polythene (Creative)
19. Differentiate thermoplastic and thermosetting (Creative)

Answer the following questions in detail : (5 Marks)

1. Explain the mechanism of cleansing action of soaps and detergents (284)

ADDITIONAL QUESTIONS:

Answer the following questions briefly: (2 or 3 Marks)

1. What are tranquilizers? (277)
2. Note on Analgesics (278)
3. Anesthetics (279)
4. Antacids (279)
5. Antioxidants (283)
6. Antiseptic (282)
7. What is TFM? (284)
8. How will you prepare Teflon? (288)
9. How will you prepare nylon 6, nylon 6,6 ? (289)
10. Mention the preparation of Bakelite (290)
11. How does Melamine undergo condensation polymerization? (291)
12. Mention the preparation of Neoprene (292)
13. How will you prepare Buna –N , Buna-S rubber? (292)
14. What is vulcanization? (292)

Answer the following questions in detail : (5 Marks)

1. Explain enzyme as drug targets (275)
2. Explain receptor as drug targets (276)

----ALL THE BEST----

Note:

- ✓ I hope this material will be useful for practice the evaluation and additional questions except sums with the help of teachers.
- ✓ It will be better to give importance to the evaluation part questions then can study additional questions.
- ✓ The question setter only can decide as 2, 3 marks or mixed together as 5 marks. The above mentioned questions are some suggestions
- ✓ But the Annual exam questions will be based on creative and higher order thinking (HOT) manner not as direct questions
- ✓ If any mistakes or your suggestions, please send your valuable thoughts to that email to help the students

DEDICATED TO : ALL THE TEACHERS AND STUDENTS

G. SURESH M.Sc, M.A, B.Ed,

P.G. ASSISTANT IN CHEMISTRY
&
CAREER COUNSELOR

THE CRESCENT MATRIC HR.SEC.SCHOOL

UTHAMAPALAYAM

THENI [DT]

CONTACT :

26/GANDHI NAGAR, CHINNAMANUR

THENI [DT]

E mail: vivekasuresh@gmail.com

https://www.linkedin.com/in/suresh-g-941427166

"THANK GOD AND THANK YOU ALL"
"ALL THE BEST"