

St. Joseph's College of Arts & Science (Autonomous)
Cuddalore – 607001

QUESTION BANK

CLASS: II- CHE., SEMESTER-IV

SUBJECT: ORGANIC CHEMISTRY-II

SUBJECT CODE: CH407S

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UNIT-I
PART – A

1. Ion which is more effective nucleophile than water
2. Reaction involving breakdown of water molecule is known as
3. Nucleophilic substitution reaction takes place when halogenoalkanes is added with aqueous solution of
4. The functional group in alkyl halide is
5. The halide ion is an extremely
6. When the nucleophile attacks the rx the resultant product will be?
(A) SN^2 reaction follows second order kinetic
(B) No intermediate is involved in SN^2 mechanism
(C) SN^2 reaction are one-step reaction
(D) all the above
8. The reactivity order of alkyl halides in SN^2 is
9. SN^1 reaction involves to form the carbocation as an intermediate
10. Which step in SN^1 reaction is a slow rate determining step
11. A low concentration of a nucleophile favours
12. Which reaction is favoured by protic aprotic solvent
13. The descending order of leaving group in nucleophilic substitution reaction is
14. Reaction of alcohol with $SOCl_2$ is
15. The rate of nucleophilic substitution reaction are higher in the presence of

PART-B

1. What is racemic mixture ?

2. Write the mechanism followed in SN2 reaction
3. What is substrate?
4. Write a short note on leaving group ?
5. How does the rate determining step respond to properties of solvent
6. What happens when cyclohexyl bromide reacts with potassium ethoxide ?
7. Which of the following compounds reacts with NaI in acetone at faster rate? A) chlorohexane B) cyclohexylchloride ?
8. Which property of solvent influence the rate of reaction the most ?
9. 2-bromo 3 methyl butane on hydrolysis gives ?
10. $\text{CH}_3\text{-S-CH}_3 + \text{CH}_3\text{I} \longrightarrow ?$
11. Write the energy profile diagram of SN1 mechanism ?
12. What is nucleophile ?
13. What is Walden inversion ?
14. Give the evidences for SN1 mechanism ?
15. Give the better nucleophile among the following with suitable example ?
A) nitrite B) nitrate

PART-C

1. Write the mechanism of SN¹ reaction?
2. Explain SN¹ mechanism using suitable example ?
3. Write a note on leaving group ability of SN1 and SN2 reaction ?
4. Explain the relative stability of carbocation?
5. Write the mechanism for the reaction between 2-bromo-2-methylpropane and hydroxide ion ?
6. Give the comparison between basicity and nucleophilicity ?
7. Write the difference between substitution and elimination reaction ?
8. Write a note on effect of substrate in SN2 mechanism ?
9. Write a note on 1) nucleophilicity
2) nucleophile and substrate
10. Write the note on stereochemistry in SN¹ reaction ?
11. Write the order and rate equation of SN² mechanism ?
12. Discuss the effect of polarity on solvent on rate of SN1 and SN2 reaction?
13. Compare the SN² and E² reaction of alkyl halide ?
14. Most of the SN¹ reaction results in partial inversion why ?
15. Draw the energy profile diagram of SN¹ and SN² reaction ?

UNIT-II

PART-A

- 1) Reduction of m-dinitrobenzene with $(\text{NH}_4)_2\text{Sx}$ gives _____.
- 2) Nitrobenzene when reduces with $\text{Sn}+\text{HCl}$ gives _____.
- 3) Hydrazobenzene when boiled with acid gives _____.
- 4) Nitrobenzene when reduced with alkaline glucose gives _____.
- 5) Aniline when oxidized with caro's acid gives _____.
- 6) Nitrobenzene when reduced with $\text{Zn}+\text{NaOH}$ gives _____.
- 7) The aromatic SN_1 mechanism encountered with _____
- 8) During electrophilic substitution in benzene the intermediate species involved is _____.
- 9) An SN_2 reaction proceed through a _____.
- 10) In nucleophilic substitution reaction the best leaving group among the following:
i] I^- ii] Br^- iii] OH^- iv] Cl^-

PART-B

- 1) Write the halogenation of benzene?
- 2) Write the mechanism of halogenation?
- 3) Write the nitration of benzene and their mechanism?
- 4) Write the sulphonation of benzene and thier mechanism?
- 5) Write the Friedel-craft alkylation of benzene?
- 6) Draw the structure for each of the following:
i] m-chloromethyl benzene
ii] 2-bromo 4-iodophenol
iii] 2,5- dinitro benzaldehyde
iv] p-bromophenol
- 7) How the following compounds could be synthesized from benzene:
i] O-nitrophenol ii] anisole
iii] p- bromoanisole
iv] p-nitroaniline
- 8) Draw the structure for each of the following:
i] phenol ii] benzaldehyde

- iii] toluene iv] anisole
- 9) What are nuclear substituted nitro compounds?
- 10) Explain the preparation of naphthol.

PART-C

- 1) What do you understand by nucleophilic substitution. Discuss its mechanisms with suitable examples.
- 2) What do you understand by the term electrophilic substitution of are new? Discuss its mechanisms.
- 3) Explain the mechanisms of electrophilic substitution in BENZENE.
- 4) Explain the mechanisms of,
- i) Friedal-craft reaction
 - ii) aromatic nitrate.
- 5) State the addition reaction of benzene particularly those with halogen and ozones.
- 6) Give the mechanisms of chlorination of aromatic hydrocarbon.
- 7) what is the criterion of aromaticity according to Huckle's rule
- 8) Draw the structure and give the name of the product if you substitute three nitro groups into methylbenzene?
- 9) What is the difference between natural frequency and driving frequency.
- 10) Explain why the nitration of anisole is much faster than the nitration of thioanisole under the same condition?
- 11) Use of electrophilic aromatic substitution in organic synthesis.
- 12) Discuss the role of tracer technique in establishing the intermediacy of benzene in aromatic nucleophilic substitution.

UNIT-III

PART-A

1. The reagent used in dehydration of an alcohols
- a) PCl_5
 - b) CaCl_2

- c) Al_2O_3
- d) NaCl

2. The IUPAC name of $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

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- a) Pentane glycol
 - b) 2,5-pentane-diol
 - c) 1,4-pentane-diol
 - d) pentanol

3. Reimer-Tiemann involves _____ intermediate

- a) Carbanion
- b) Carbene
- c) Carbonium ion
- d) Free radical

4. Cyclohexanol is _____ alcohol

- a) Primary alcohols
- b) Secondary alcohol
- c) Tertiary alcohol
- d) Methyl alcohol

5. Ethanol on oxidation with KMnO_4 gives _____

- a) Formic acid
- b) Formaldehyde
- c) Acetaldehyde
- d) Methanol

6. The IUPAC name of diethyl ether is _____

- a) Ethyl ethanoate
- b) Ethoxy methane
- c) Ethoxy ethane
- d) Methoxy methane

7. _____ is the product of Kolbe-Schmidt reaction

- a) Salicylic acid
- b) Phenol

- c) Alcohol
 - d) Ether
8. Secondary alcohols on oxidation gives _____
- a) Ester
 - b) Acid
 - c) Aldehyde
 - d) Ketone
9. Allylic bromination is carried out with the help _____
- a) NBS
 - b) NCS
 - c) HBr
 - d) HBr/H₂O₂
10. RCOOR is the functional group of _____
- a) Acid
 - b) Alcohols
 - c) Ester
 - d) Ether
11. Phenol is more acidic than _____
- a) Hydrochloric acid
 - b) Nitric acid
 - c) Ethanol
 - d) Periodic acid
12. _____ is the product of Lederrer-Manasse reaction
- a) Aspirin
 - b) Bakelite
 - c) Phenol
 - d) Resorcinol
13. Red dye is formed when phenol reacts with _____
- a) Alcohols
 - b) Diazonium salt
 - c) Hydroxyl benzene
 - d) Benzaldehyde
14. Glycerol on heating with oxalic acid at 170 °C gives
- a) Ethanol

- b) Methanoic acid
- c) Acetone
- d) Ether

15. The IUPAC name of ethyl methyl ether is

- a) Ethyl ethanoate
- b) Ethoxyl methane
- c) Ethoxy ethane
- d) Methoxy ethane

16. Williamson ether synthesis is an example of substitution known as _____

- a) Electrophile
- b) Nucleophilic
- c) Free radicals
- d) Elimination

17. Ethers are basic, as they form salts with strong acids which are known as

- a) Oxonium salts
- b) Hydronium salts
- c) Hydrogen sulphates
- d) Ions

18. Phenol is a stronger acid than _____

- a) Carbonic acid
- b) O-cresol
- c) O-nitro phenol
- d) P-nitrophenol

19. Intra molecular hydrogen bonding in o-nitrophenol _____

- a) Increases m.pt
- b) Decreases m.pt
- c) Increases m.pt
- d) No effect

20. Order of acid strength of alcohols

- a) Tert.alcohols > sec.alcohols > pri.alcohols > CH₃OH
- b) Sec.alcohols > pri.alcohols > tert.alcohols > CH₃OH
- c) CH₃OH > pri.alcohol > sec.alcohol > tert.alcohol

21. Acid catalysed hydration of alkenes except ethene leads to the formation of _____

- a) Primary alcohol
- b) Secondary alcohol
- c) Allyl alcohol

22. Among the following which is least acidic _____

- a) Phenol
- b) O-cresol
- c) P-nitrophenol
- d) P-chlorophenol

23. Catalytic dehydrogenation of a primary alcohol gives a

- a) Ketone
- b) Aldehyde
- c) Secondary alcohol
- d) Ester

24. Chloroethane reacts with X to form diethyl ether what is X

- a) NaOH
- b) H_2SO_4
- c) $\text{C}_2\text{H}_5\text{ONa}$
- d) $\text{Na}_2\text{S}_2\text{O}_3$

25. Phenol yields O group it is negative charge is even more strongly electron releasing than the _____ group

- a) -OH
- b) -COOH
- c) -CHO
- d) -COOR

PART-B

1. What is alcohol ?
2. How do you understand the term primary, secondary and tertiary alcohol ?
3. Explain why lower alcohols are soluble in water ?
4. Explain why alcohols cannot be used as solvent for Grignard reagent ?
5. Why is glycol more viscous than ethanol ?
6. How will you convert sec alcohol to tert alcohol ?
7. How will you convert glycerol to allyl alcohol ?
8. Explain the esterification of property of alcohol ?
9. How do alcohol behave towards oxidizing agent ?
10. Write a note on dehydration of ethanol ?
11. What is the action of Grignard reagent with alcohol ?
12. What happens when aldehydes react with alcohols ? Give example
13. What are the possible products of oxidation of primary alcohol ?
14. Write the preparation of allyl alcohols ?
15. Discuss the acidity of phenol ?
16. List out the types of alcohols with suitable examples ?
17. Write one preparation of alcohol
18. Predict the product of the following reaction
Butanol+KMnO₄-----→?
19. Illustrate dehydration of 1-Butanol
20. Give one preparation of Allyl alcohol
21. How will distinguish primary , secondary and tertiary alcohols ?
22. What is the action of periodic acid with glycol?
23. How will you prepare ether from alcohol?
24. Give any one method of preparation of diols?
25. Mention the sources of phenol ?
26. Discuss Williamson reaction ?
27. What is an Reimer-Tiemann reaction ?
28. Illustrate the cleavage of diethyl ether ?
29. Write a note on Lederrer-Monasse reaction?
30. Write a note on allylic substitution using NBS?
31. What is the action of CO₂ with sodium salt of phenol?
32. Illustrate diazonium coupling ?
33. Write the IUPAC name for following compounds
1)CH₃-O-CH₃ 2)CH₃CH₂-O-CH₂CH₃

3)CH₃CH₂-O-CH₃

34. Give one famous synthetic reaction for ether synthesis?
35. Discuss the cleavage of diols using Periodic acid and Lead tetra acetate ?
36. Write a note on Kolbe-Schmidt reaction?
37. What is the uses of NBS?
38. How are ethers cleaved using acids?
39. What happens when glycerol reacts with HIO₄?
40. Write a note on coupling reaction?
41. Write a note on preparation of alcohol from aldehyde and ketone?
42. Phenol has a smaller dipole moment than methanol ?
43. Phenols do not give protonation reaction readily ?
44. Alcohols are weaker acid than water ?
45. Why ethers are not soluble in water ?

PART-C

1. Write the preparation of alcohols by reduction of aldehyde and ketone?
2. Write the preparation of alcohol by reduction of acid and esters?
3. Write the preparation of alcohol by reduction of Grignard reagent?
4. Explain the oxidation property , esterification and dehydration of alcohol?
5. Explain the cleavage of diols using periodic acid and lead tetra acetate ?
6. What is allyl alcohol? And its preparation ?
7. Explain allylic substitution using N-bromo succinimides(NBS) ?
8. What is phenol and its structure and bonding?
9. Explain about acidity of phenol ?
10. Give the mechanism of Reimer-Tiemann reaction ?
11. Give the mechanism of Kolb-Schmidt reaction ?
12. Give the mechanism of Lederrer Monassc reaction ?
13. Give the mechanism of coupling diazonium salts ?
14. What is ether and its preparation , structure and bonding ?
15. Explain about the Willamson synthesis ?
16. Explain about the cleavage of ethers by acids ?

UNIT-IV

PART-A

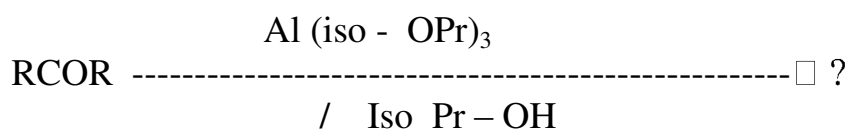
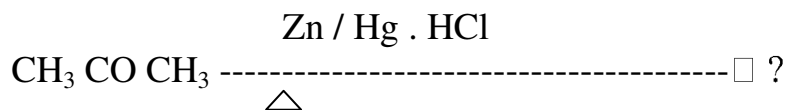
- 1 . The reagent used in Clemmensen's reduction is -----
- 2 . The reagent used in Wolff – kishner reduction is-----
- 3 . In Wolff – kishner reduction ketones are reduced into-----
- 4 . The ketones react with to form -----
- 5 . Aldehydes and ketones contain an alkyl group is bonded with either-----

- 6 . A formyl group (-CH=O) is attached to a ring , the ring name is followed by the suffix-----
- 7 . The name of the ketone is always ends up with _____
- 8 . The alkyl group is attached with benzene ring , the ring name is followed by the suffix -----
- 9 . The bond angles involving in the carbonyl group of aldehyde and ketones are close to-----
- 10 . Aldehyde and ketones can form hydrogen bond with the proton of --
----- group
- 11 . Formaldehyde is used in the production of -----
- 12 . the migratory aptitude of the various alkyl group is -----
- 13 . The strong base can abstract an α -hydrogen from -----
- 14 . Reduction of aldehydes and ketones into hydrocarbon using Zinc amalgam and con . HCl is called-----
- 15 . the product formed in Aldol condensation is-----

PART-B

- 1 . Explain Wolff – Kishner reduction .
- 2 . Give the addition reaction of acetaldehyde with Grignard reagent ?
- 3 . outline the mechanism of Benzoin condensation .
- 4 . Discuss Norrish type I reaction .
- 5 . What happens when aldehydes react with alcohol ? Give reason .
- 6 . How will you prepare 2- butanone .
- 7 . why aldehydes and ketones have higher boiling point than alkenes?

- 8 . why aldehydes and ketones have lower boiling point than alkenes?
- 9 . Explain Hydroformylation?
- 10 . Define cyanohydrins formation ?
- 11 . Define Hemiacetal ?
- 12 . Define acetals ?
- 13 . Define Carbinolamine ?
- 14 . Define aldehydes and ketones ?
- 15 . Write the mechanism of Aldol Condensation



- 16 . Give the method of preparation and two reaction of acrolein?
- 17 . Give the IUPAC name given the structure, and draw the structure given the name, of aldehydes and ketones. Also, draw the structure given any of the following common names: formaldehyde, acetaldehyde, benzaldehyde, acetone, acetophenone.
- 18 . Explain oxidation of primary and secondary alcohols?
- 19 . Explain ozonolysis of alkenes?
- 20 . Explain hydration of alkynes?
- 21 . Explain Friedel – crafts acylation ?
- 22 . Classify the following as aldehydes or ketones and give their IUPAC names:
 - (i) CH_3CHO
 - (ii) CH_3COCH_2
 - (iii) $\text{OHCCH}_2\text{CH}_3$
- 23 . How will you prepare propanone from propyne ?
- 24 . Why are aldehydes more reactive than ketones towards nucleophilic addition reactions?
- 25 . Write the general structure for the following :
 - (i) a cyanohydrin
 - (ii) an acetal
 - (iii) a hemiacetal
- 26 . How can you convert the carbonyl group to group ?
- 27 . What is an aldol?
- 28 . Write the equation for cannizzaro reaction using a suitable example.
- 29 . what is meant by internal conversion in photochemical reaction ?

- 30 . Define wittig reaction .
- 31 . Define Singlet state in photochemistry .

PART-C

- 1 . Give the mechanism of Knoevenagel reaction?
- 2 . Write a note on Aldol condensation ?
- 3 . Write the mechanism of the Perkin's condensation ?
- 4 . Write a note on Cannizzaro's reaction?
- 5 . Write a note on Norrish Type- I reaction with example ?
- 6 . Draw the Jablonski diagram
- 7 . Write the mechanism of the Benzoin condensation ?
- 8 . Write the mechanism of the Claisen condensation ?
- 9 . Write a note on Norrish Type – II reaction with example ?
- 10 . Explain addition reaction of carbonyl compound with bisulphate .
- 11 . write a note on Wolff – Kishner reduction .
- 12 . Give the mechanism of reduction of carbonyl compound by LiAlH_4 .
- 13 . Explain the acidity of alpha hydrogen in carbonyl compound .
- 14 . Give the mechanism of reduction of carbonyl compound by NaBH_4 .
- 15 . Explain the solubility of aldehyde and ketone in alkenes and alcohol .
- 16 . Write a note on hydration mechanism .
- 17 . Explain the mechanism of cyanohydrin formation .
- 18 . Explain the mechanism of acetal formation .
- 19 . Explain the mechanism of Bayer's Villiger oxidation of ketone .
- 20 . comparison of ketone and aldehydes .
- 21 . compare and contrast the chemical properties of aliphatic aldehydes and ketones .
- 22 . what are aldehydes and ketones ? Point out the structural relationship between the two types of compound .
- 23 . Explain the physical properties of aldehydes and ketones .
- 24 . Explain the structure of aldehydes and ketones .
- 25 . Explain the reaction in alpha carbon .
- 26 . Explain the oxidation of aldehydes
- 27 . Explain the De – oxygenation reaction .
- 28 . Explain the addition – elimination or Condensation reaction .
- 29 . Explain the various preparation of aldehydes and ketones .
- 30 . Explain the mechanism of nucleophilic addition .

UNIT-V

PART-A

1. General formula for carboxylic acid is _____
2. The source of butyric acid is _____
3. CH_3COOH , $\text{C}_6\text{H}_5\text{COOH}$ have dipole moment in the range is _____
4. Find the name of the compound $\text{C}_6\text{H}_5\text{CH}=\text{CHCOOH}$
5. Carboxylic acids are stronger than _____
6. Carboxylic acids are _____ solvents
7. $\text{CH}_3\text{COOH} + \text{Zn}$ _____?
8. Find the IUPAC name of the compound $\text{C}_6\text{H}_5\text{-CH(OH)-COOH}$
9. IUPAC name of succinic acid is _____
10. _____ is used to calico printing.
11. _____ is used to remove ink stains.
12. $\text{CH}_3\text{CH(OH)COOH} + \text{con.H}_2\text{SO}_4$ _____?
13. Hexanedioic acid-common name is _____
14. Phthalic acid reacts with resorcinol in presence of $\text{con.H}_2\text{SO}_4$

15. Cream of tartar is _____
16. Which one is not (COOH)
a) Phthalic acid b) Malic acid c) Maleic acid
17. Monocarboxylic acid is _____
18. Hydroxylation of Maleic acid with dil.KMnO_4 to give _____
19. Which one of the following acid on heating gives aniline?
a) Anthranilic acid b) Salicylic acid c) Benzoic acid d) Succinic acid
20. Which one of the following acid give Nylon6,6 when heated with hexamethylenediamide?
a). Adipic acid b). Oxalic acid c). Succinic acid

PART-B

1. What are carboxylic acids?
2. How carboxylic acid is formed?
3. What are the rules for naming a carboxylic acid?
4. What are the physical properties of carboxylic acid?

5. What is the simplest aromatic acid?
6. Why carboxylic acid is weak acid?
7. Write the Hell-Volhard Zelinsky reactions ?
8. Discuss the structure of carboxylate Ion ?
9. Uses of Adipic acid ?
10. Write a note on oxidation property of oxalic acid ?
11. Carboxylic acid molecules can't form H-bonding why? Explain.
12. HCOOH is stronger than CH₃COOH Why? Explain.
13. O-Toluic acid is weaker than m-Nitro benzoic acid why? Explain.
14. Compare: P-fluorobenzoic acid & P-Chloro benzoic acid ?
15. Why COOH- group is m-directing in Benzoic acid? Explain.
16. What is Hunsdiecker reaction?
17. What is action with Br-Br &-CHO in malonic acid?
18. Why carboxylic acid is much stronger than -OH?
19. How will you convert oxalic acid into HCOOH?
20. Benzoic acid is more acidic than CH₃COOH?
21. How will you get oxamide from COOH-COOH ?

PART-C

1. What is Arndt-Eistert reaction?
2. Discuss the esterification of CH₃COOH with CH₃CH₂OH
3. What happens when
 - a). Malonic acid is heated at 140-150°C
 - b). Salicylic acid is treated with Acetyl chloride
4. How will you convert salicylic acid into "ASPIRIN"
5. How will you prepare malonic acid & give its uses.
6. Carry out the following reactions:
 - a). Chlorobenzene into salicylic acid
 - b). Benzene into Benzoic acid
7. Write the structure and functions of dicarboxylic acid?
8. Reactions with benzoic acid in each compound:
 - a). aqueous NaOH
 - b). aqueous NaHCO₃
9. Write the properties of Adipic, Glutonic acids.
10. Find the IUPAC NAMES:
 - * CH₃-CH₂-CH₂-COO-Li⁺
 - *CH₃-CH₂-CH₂-COONH₄

11. Write the equations for the BUTYRIC ACID:
*aqueous NaOH, aqueous NaHCO₃