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

Cuddalore – 607001

QUESTION BANK

CLASS: I - M.Sc., CHEMISTRY, SEMESTER-II
SUBJECT: REAGENTS AND NAMING REACTIONS
SUBJECT CODE: EPCH808Q
NAME OF THE STAFF : Mr S. RICHARD RAJKUMAR, Mr S. ALBERT NIKSON

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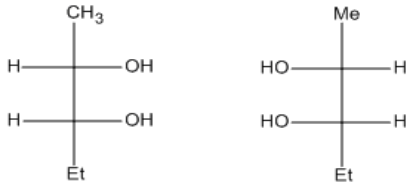
UNIT-I

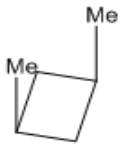
PART – A

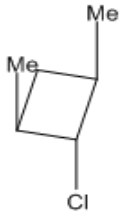
1. A symmetry element present in biphenyls and allenes is
   a) i b) C_n
   c)σ d) None
2. The sufficient and essential condition for optical activity is _____
3. The configuration of chiral centres in meso-tartaric acid is _____
4. The structure of R,S-tartaric acid is _____
5. meso-tartaric acid is _____
   a) sometimes optically active b) always optically active
   c) sometimes optically inactive d) always optically inactive
6. The most stable conformation for n-butane
   a) Skew-boat b)eclipsed c) Gauche d) Staggred-anti
7. How many optical isomers are possible for lactic acid_____
8. The concept of stereochemistry based on _____
9. The following compounds are

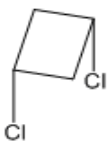


   a) enantiomers b)diastereomers c)Identical d)epimers
10. Which of the following compounds is chiral?

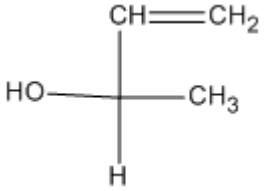
a) 

b) 

c) 

d) 

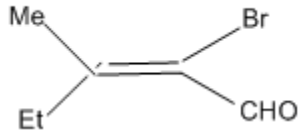
11. The configuration of the following compound is

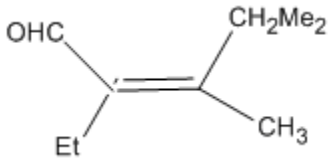


12. Among the following which has the same configuration at both of their asymmetric carbons?
    a) – tartaric acid b) meso-tartaric acid c)+ tartaric acid
13. Among the following which has the highest priority in R-S nomenclature?
    a) I b) Cl c) – OH d) – NO_2
14. Which of the following compound will be optically active?
    a) Propanoic acid b) 3 – chloropropanoic acid
    c) 2 – chloropropanoic acid d)3 – chloropropane
15. Reduction of Acetophenone with R-selectride gives exclusively R-carbinol, this reaction is an example for _____.
16. Stereochemistry resulting from restricted rotation about single bond are called__.
17. The hybridization of central carbon in allene is_____.
18. _____ rule is used for diastereoslective synthesis.
19. 2-butanol is optically active because it contains_____.
20. The hybridization of the end carbon in allene is _____.

PART – B

1. Draw the sawhorse projection of mesotartaric acid and convert to newmann projection ?
2. Give the geometrical isomers of 1,3 – disubstituted cyclopentanes ?
3. Draw the fischer and sawhorse projection of meso 2,3 – dibromobutane ?
4. Discuss the geometrical isomers of disubstituted cyclobutanes ?
5. Write the sawhorse and newman projection of 2,3 – butanediol ?
6. Give the possible geometrical and optical isomers of 1,2 – dimethylcyclopropane ?
7. Assign R and S notation for lactic acid?
8. Define diasteromers with suitable examples ?
9. Define enatiomers with suitable examples ?
10. Assign E/Z nomenclature of the following compounds

a) 

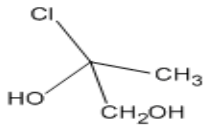
b) 

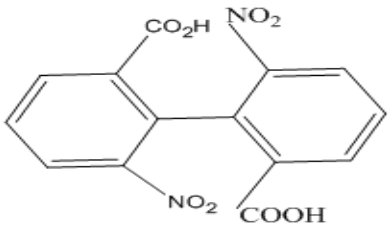
11. Assign the R and S notation for phenyl alanine and valain ?
12. Explain E/Z nomenclature of alkenes with example ?
13. Draw the most stable conformation of cis-1-tert.butyl-4-methylcyclohexane and expalain ?
14. Using the symmetry consideration show if or not the two H's of CH2Cl2, CH2ClF are homotopic or enatiotopic ?
15. Write the all possible isomers of 1-chloro-2,4-heptadiene ?
16. What is Asymmetric synthesis?
17. What is sterospecific reaction?
18. State cram's rule ?
19. What is atropisomerism?
20. Give an example for stereoselective reactions ?

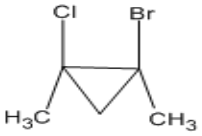
PART –C

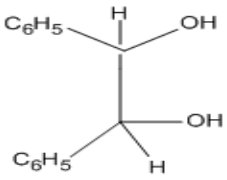
1. Assign R,S configuration for any two chiral allenes and biphenyls ?
2. Briefly explain the conformation of cyclohexane ?
3. Explain enatiotopic and diasterotopic ligands and phases
4. a) Assign R and S configuration for any two spiranes
   b) Predict the hydrogen atom in cis-1,2-dichlorocyclopropane and its trans isomers as homotopic and enatiotopic or diasterotopic.

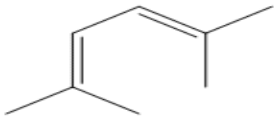
5. Assign the following compounds as R/S or E/Z configuration

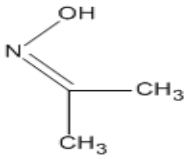
a) 

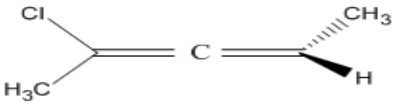
b) 

c) 

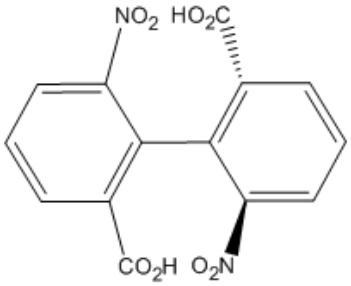
d) 

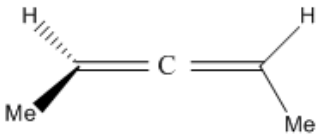
e) 

f) 

g) 

6. a) assign R/S configuration

a) 

b) 

b)which of the following compound has a stereoisomers that is a mesocompound?

i) 2,3-dimethyl butane

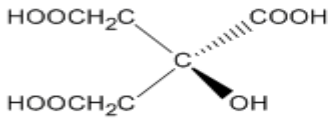
ii)1,3-dimethylcyclodecane

iii)3,4-dimethylhexane
iv) 2-bromo-3-methyl pentane

c) what stereoisomer would you expect to obtain from the addition of cis-1,2-dimethylcyclopentane i) H_2/Pt ii) Br_2/CH2Cl2

7. label the groups and faces homotopic and enatiotopic or diastereotopic in the following compounds.

a)



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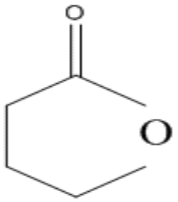

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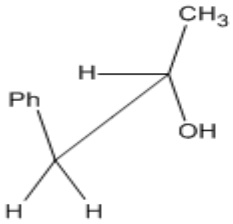

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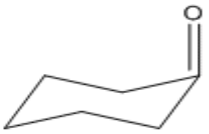

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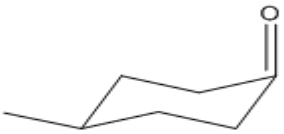
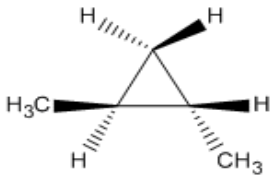
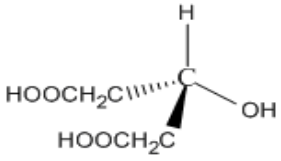
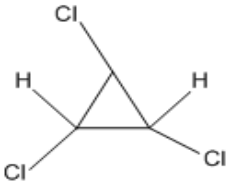
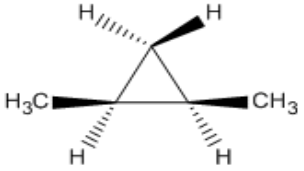


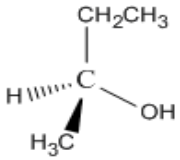
8. Identify the indicated H's or ligands in as enatiotopic and diastereotopic or homotopic

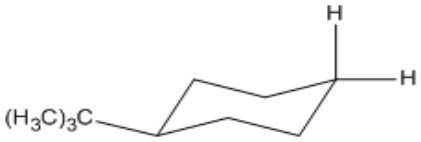
a) 

b) 

c) 

d) 

e) 

f) 

9. Interconversion of Fischer, Newmann & Sawhorse projection. Briefly explain with the example ?
10. Explain briefly about Assymmetric synthesis ?
11. Conformational analysis of cyclohexane and their effects on reaction ?

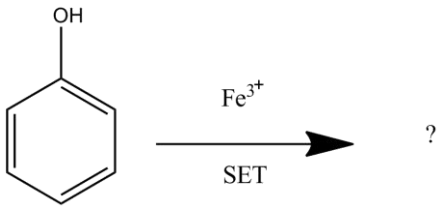
UNIT-II
PART – A

1. Which of the following is not an electrophile?
   a) NO^{2-} b) SO_4^{2-} c)Br^- d)NH_2+
2. The central c-atom of carbine possess_____.
3. _____refers to ions with positive charge on carbon.
4. The number of unshared electrons of the carbine carbon is_____.
5. The most stable free radical is _____.
6. The role of Cu(I) in the sandmeyer reaction is _____.
7. The hammet equation is _____.
8. The correct order for the stability of free radicals_____.
9. Carbanion refers to ions with _____ charge on _____.
10. When carbenes are added to olefins, the reaction is_____.

11. In the conversion of Benzyl chloride to benzamine , the intermediate formed is_____.
12. The reagent used in Sandmayer's reaction_____.
13. The product of thermodynamic control reaction is_____.
14. The product of Pschorr reaction is_____.
15. Hammet equation relates_____.
16. In hammet equation, when X is a EWG, it _____ the rate of the dissociation of Benzoic acid.
17. In hammet equation, when X is a EDG, it _____ the rate of the dissociation of Benzoic acid.
18. In hammet equation, σ refers_____.
19. In hammet equation, ρ refers_____.
20. _____ is applicable for reaction taking place closer to aromatic rings.

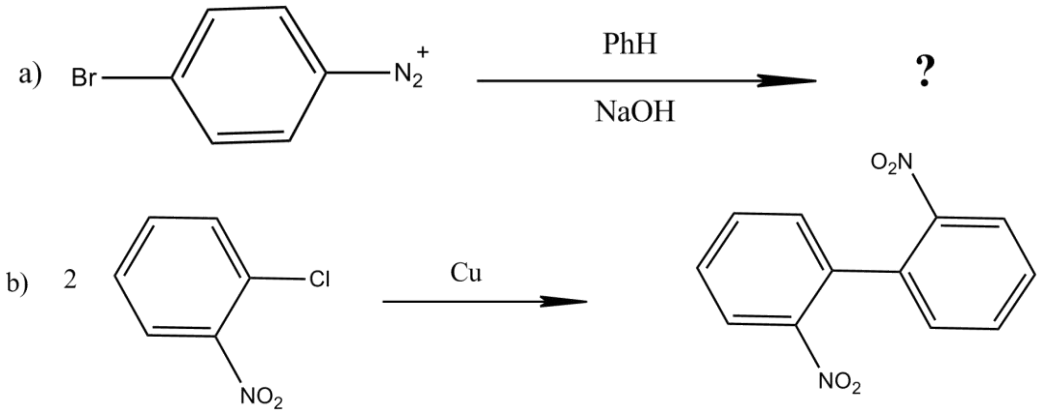
PART – B

1. Define Hammet equation ?
2. Explain the stability of Free radicals ?
3. What are free radicals? How they are classified ?
4. Explain the structure of Carbanions ?
5. Explain the structure of Free radicals ?
6. Explain the reactivity of Carbanions ?
7. Stability and reactivity involving carbenes ?
8. Explain Ulmann reaction ?
9. What is meant by kinetically controlled reactions ?
10. Explain the mechanisms of free radical addition to olefins?
11. Write Beckmann rearrangement ?
12. How are nitrenes generated? Give two examples.
13. Give any two reactions of Carbenes ?
14. Write short notes on Kinetic method?
15. Write short notes on Non-Kinetic method ?
16. Explain the stability of carbocation based on Inductive effect ?
17. Write one example for the formation ion free radical by thermolysis ?
18. What are the methods of determining reactions mechanisms?
19. Define Pine addition ?

20. 

PART – C

1. What is Favorskii Reaction? Which side reaction occurs with Favorskii Rearrangement ?
2. Discuss the structure, reactivity and stability of carbanions ?
3. What are free radicals ? How they are classified ?
4. Stability and reaction involves carbenes ?
5. Discuss briefly about Kinetic Isotope effect ?
6. Suggest the mechanism for the following transformation and predict the product ?

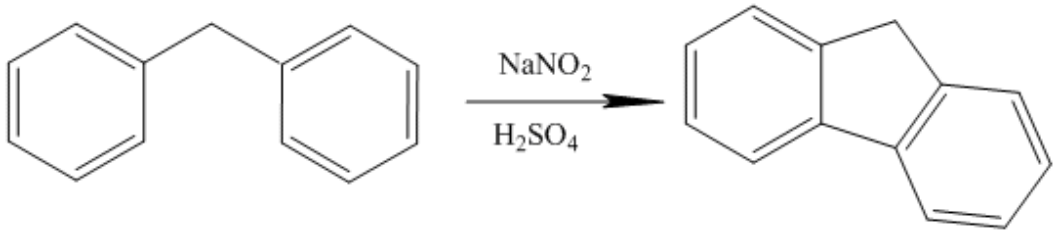


7. Difference between Kinetic and thermodynamic control ?
8. Discuss the formation of carbocations with an suitable example?
9. Discuss the addition of free radicals to olefinic double bonds ?
10. Write the mechanisms for radical substitutions in aromatic molecules ?
11. a) explain the stability of carbocation based on inductive effect ?
    b) discuss the formation of free radical by thermolysis

12. How to generate the long live free radicals ?
13. Explain the mechanism for sandmayer's reaction ?
14. Discuss the method of formation of carbocations and stability ?

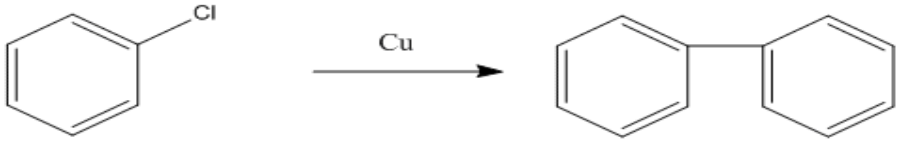
15. Discuss briefly about Nitrenes ?
16. How the benzyne intermediate is formed and discuss the reactivity ?
17. Give the comparative study for stability, structure and reactivity for carbocations, carbanions, carbon free radicals and carbenes and nitrenes ?

18. Explain the mechanism for the following reaction,



19. Explain the mechanism for the following reaction,

a)



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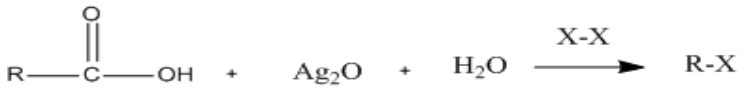

20. Explain the mechanism for the diazotization process ?

UNIT –III
PART-A

1. General formula for carboxylic acid is ____
2. The source of butyric acid is_____
3. CH_3COOH, C_6H_5COOH have dipole moment in the range is _____
4. Find the name of the compound $C_6H_5CH=CHCOOH$
5. Carboxylic acids are stronger than _____

6. Carboxylic acids are _____solvents
7. CH_3COOH +Zn____?
8. Find the IUPAC name of the compound C_6H_5-CH(OH)-COOH
9. IUPAC name of succinic acid is_____
10. _____ is used to calico printing.
11. _____ is used to remove in ink stains.
12. $CH_3CH(OH)COOH$ + con.H_2SO_4 _____?
13. Hexanedioic acid-common name is _____
14. Phthalic acid reacts with resorcinol in presence of con.H2SO4 _____
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.KMnO4 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 is favorskii reaction?
2. Write Haffmann rearrangement reaction ?
3. Describe the mannich reaction with its mechanism ?
4. Write Schmidt rearrangement ?
5. Write wolf kishner reduction ?
6. Write MPV reduction ?
7. Describe Roution functional group transformations ?
8. Hoffmann-loffler –fretag reaction ?
9. Write Stork-enamine reaction ?
10. Write Lossen rearrangement ?

PART-C

1.Write Brich reduction ?
2.Write Simmons-Simth reaction ?
3. Write Cope reattagement ?
4.Write Beckmann rearrangement ?
5.Write Curtius rearrangement ?
6.Write Claisen rearrangement ?
7.Write Fries rearrangement ?
8.Write Baeyer – Villager mechanism ?
9.Write Clemmenson reduction ?
10. Shapiro reaction ?
11. Write nitrene intermediate reactions with mechanism ?
12. Explain the naming reaction involved aldehyde and ketone into alkane ?

UNIT-IV

PART – A

1. selenium which burns in air with a …… flame.

2. osmium tetroxide can be prepared by the oxidation of ……. compounds by atmospheric air.

3. osmium tetroxide reacts immediately with …… and ……

4. Naphthalene and anthracene but not benzene to form ……..

5. Pyridine and quinoline act as ……..during ……..oxidation.

6. osmium tetroxide is a powerful …….agent.

7. DCC is prepared by the oxidation of ……...by mercuric oxide.

8. DCC is also used in the cyclization of pencilloic acid to beta-lactum during the synthesis of ……..

9. osmium tetroxide to reacts with Maleic and fumaric acid to form ……..

10. Tertiaryamine oxide in presence of osmium tetroxide as a catalyst gives better yields of ……

11. selenium we may know the ……..of the compound.

12. selenium dehydrogenation is used during the ……..synthesis of hydrocarbons.

13. ……..acid was first compound on which selenium dehydrogenation was applied.

14. The oxidation is usually carried out in acetic acid and the actual reagent is ……acid.

15. Allyl group can either be hydroxylated on the …….position.

16. When the double bond is present in the ring oxidation takes place at the …….. position.

17. As a catalyst selenium dioxide reacts with fumaric acid to form …….

18. Dehydrogenation of selenium dioxide of acetic acid to form…….

19. Write the one example for intermolecular hydrogen transfer rearrangement.

20. Write the simple uses for selenium dioxide and osmium tetroxide,DCC.

PART – B

1. Give an account of the aliphatic diazo compounds with special reference to their preparation and synthetic uses. Discuss their constitution ?

2. What are the uses of Gilman's reagent in organic chemistry?

3. Discuss the uses of the following compounds in organic chemistry:

   (a) trimethylsilyl iodide (b) tri -n-butyl tin hydride
   (c) osmium tetroxide (d) 1,3- dithiane

4. Explain the preparation of Dicyclohexylcarbodiamide (DCC) ?

5. Explain the preparation of Aryl alkyl ethers in DCC ?

6. Preparation of amides in the presence of DCC ?

7. Synthetic uses of DCC reagent ?

8. Explain the preparation of Osmium Tetroxide and their uses ?

9. Write the affects of Osmium tetroxide in oxidation of Anthracene and Naphthalene?

10. Synthesis of Cortisone used as Osmium tetroxide?

11. Write the mechanism of Acraldehyde to glyceraldehyde used as Osmium tetroxide act as a catalyst?

12. Explain the preparation of Selenium Dioxide ?

13. Write the uses of Selenium Dioxide?

14. Write the mechanism of Cyclohexanol to Adipic acid used as selenium dioxide act as a catalyst?

15. Write the mechanism of Dehydrogenation of Selenium dioxide ?

16. Write the uses of LDA reagent ?

17. Write short notes with illustration on the uses of the following reagents:

(a) dicyclohexyl carbodiimide (b) Osmium tetroxide
(c) Selenium dioxide

18. Write the preparation of Anhydrides using Dicyclohexylcarbodiimide?

19. Write the formation of photoenols and photoenolisation with the suitable example?

20. Explain any few physical properties of beta-gamma unsaturated Ketones?

PART - C

1. Write short notes on Peterson's synthesis and Baker's yeast ?

2. Explain photochemistry uses of complex metal hydrides briefly ?

3. Write an essay on the uses of wilkinson's catalyst in hydrogenation and dehydrogenation of organic compounds ?

4. Discuss the important uses of any two of the following reagents and explain the mechanism of the reactions involved:

(a)Gilman's reagents
(b) Trimethylsilyl iodide
(c) Tri-n-butyl tin hydrides .

5. Discuss the following:

(a) Selenium dioxide dehydrogenation
(b) DDQ Anhydrides

(c) Merrifield resin reaction.

6. Write note on the preparation and uses of three of the following:

(a) lithium diisopropylamide (b) Baker's yeast
(c) Peterson's synthesis.

7. Give an account of any three of the following reagents indicating their importance in organic synthesis.

(a) Organic peracids
(b) lithium aluminium hydride and sodium borohydride
(c) Aluminium isopropoxide and aluminium ter-butoxide.

8. Discuss the uses of any three of the following reagents in organic chemistry ?

(a) sodium borohydride,
(b) organolithium compouds,
(c) selenium dioxide.

9. Discuss the uses of any three of the following reagents in organic chemistry.

(a) Merrifield resin reactions,
(b) DCC reagents,
(c) lithium aluminium hydride.

10. Give the important uses of any four of the following in organic synthesis.

(a) 1,3-dithiane,
(b) trimethylaminoacetohydrazidechloride,
(c) aluminium ter- butoxide, (d)osmium tetroxide.

11. How can act as Osmium tetroxide as a catalyst explain briefly ?

12. Why they used the Dicyclohexylcarbodiimide by Wittig reaction their proper reason and their mechanism ?

13. Predict the product for the following reactions and mechanism by using dehydrogenation of selenium dioxide.

(a) Benzyl alcohol to …….?
(b) Acetic acid to ……?
(c) Ethyl succinate to …….?

14. Explain Alpha cleavage and Beta cleavage of cyclobutanones briefly.

15. Write a short note on Intermolecular hydrogen transfer and Intermolecular photo reduction ?

UNIT-V

PART-A

1. Green chemistry eliminates waste
   a) At the end of the process b) at the source
   c) Middle of the process d) None of these
2. Which technique does not assist in greener synthesis of chemicals,…
   a) Derivation methods b) Microwave assisted reactions
   c) Ultrasound assisted reactions d) Use of catalytic reactions.
3. _____ is not a green solvent.
4. Ionic liquids, being _____ and _____ in character.
   a)Polar and Ionic b) Polar and non-ionic
   c)Non-polar and Ionic d)Non-polar and Non-Ionic
5. One example for atom exonomic reaction is
   a)Micheal addition b) Cope rearrangement
   c)MPV reduction d) Diels-Alder reaction
6._____ is the father of green chemistry
7._____ is a use of microwave reaction
8._____ is the use of ultrasound

9._____ is the use of ionic liquids
10._____ is the use of super critical solvent

PART- B

1. What is meant by Green chemistry?
2. Write any one example for atom-economic reaction ?
3. Write briefly about microwave reaction ?
4. Discuss about Ionic liquids ?
5. Write a short note on Ionic liquids ?
6. Write about Ultrasound assisted synthesis ?
7. Discuss about the synthesis of Merrifield synthesis ?
8. State principle of Green chemistry ?
9. How microwave method are used in organic synthesis ?
10. Explain multi-component reactions ?
11. Write any two ionic-liquids ?
12. Synthetic methods of ionic-liquids ?
13. How Ionic-liquid are used in organic synthesis ?
14. How super-critical solvent used in organic synthesis ?

PART-C

1. Draw the phase diagram of Super-critical solvents?
2. What is super critical solvents ?
3. What is ionic liquids ?
4. What is main role of green chemistry?
5. What is genesis of green chemistry?
6. Explain stratergies alternative technique in organic synthesis ?
7. Explain twelve principel of green chemistry ?
8. Briefly explain about green reagent and green solvents ?
9. What are the advantages of biological and renewable feedstocks ?
10. How is atom economy different from yield ?