

B.Sc.Part III (Semester- VI) CBCS Examination March/April.-2022

Chemistry –(Paper XIV) Organic Chemistry

Subject Code: 81675

Question bank

Q.1) A. Answer in one sentence

1. Chloramphenicol belongs to which type of drug ?
2. What will be product obtained on reduction of $R - C \equiv C - R$ with Lindlar's catalyst?
3. Which functional group is present in Citral ?
4. What will be product obtained on oxidation of dicyclohexyl urea with *p*-toluene sulfonyl chloride in hot pyridine ?
5. Which products are obtained on ozonolysis of Citral?
6. What are the products of addition of H_2O to Propylene ?
7. Which side chain is linked to pyridine ring in Nicotine molecule?
8. Which drug is used in treatment of malaria?
9. Phenobarbitone belongs to which type of drug ?
10. What will be the product obtained by reduction of $CH_3 - C \equiv C - CH_3$ with excess Nickel catalyst?
11. Which compound is acting as plant growth regulator?
12. In which reaction phosphorus ylide is used as a reagent?
13. What will be obtained by reaction of cyclohexane with NBS ?
14. In which reaction [4+2] cycloaddition reaction takes place?
15. Write the structure of Nicotine
16. How will you distinguish the presence of carbon carbon double bond ?
17. How will you confirm the presence of two tertiary nitrogen atoms

in Nicotine ?

18. In which reaction the conversion of carbonyl compounds is converted into Alkenes ?
19. How will you convert amides into primary amines ?
20. What is the long form of NBS ?

B. Select most correct alternative among those given below and rewrite the sentences.

1. decrease psychomotor activity without causing sedation.
(a) Tranquilizers (b) Hypertensive drugs (c) Sedatives (d)

Anticonvulsants

2 Conjugated diene reacts with which among the following to form a cyclohexene?

- (a) Phenol (b) Hexane (c) Tribromo phenol (d) Dienophile

3. Ozonolysis of an alkene gives only acetaldehyde as the main product.

The

alkene is.....

- (a) $\text{CH}_3-\text{CH}=\text{CH}_2$ (b) $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$ (c) $(\text{CH}_3)_2\text{CH}=\text{CH}_2$ (d) $\text{CH}_2=\text{CH}_2$

4. Dicyclohexyl carbodimide (DCC) is act asagent

- a) Oxidising (b) Reducing (c) Dehydrating (d) Hydroxylating

5. Propene on addition of HBr produces ----- as major product

- a) 1-bromopropane (b) 2-bromopropane
c) 1,2 dibromopropane (d) Propane

6. Synthetic equivalent of alkyl anion is a----

- a) Grignard reagent (b) NBS reagent (c) Tollen's reagent
d) Nessler's reagent

7. Monoterpenoids contains isoprene units.

- a) one (b) two (c) three (d) four

8. How many π bonds present in Acetylene?
(a) 2 (b) 4 (c) 1 (d) 3
9. Nicotine on oxidation with chromic acid gives.....
(a) Pyrrole (b) Pyridine (c) Nicotone (d) Nicotinic acid
- 10is used to convert propene into 1- propyl alcohol.
(a) Borane/H₂O₂ (b) Cold aq.KMnO₄ (c) Ozone (d) H₂O/H⁺
11. Synthetic equivalent of CH₃CO⁺ is.....
(a) Acetyl chloride (b) Benzoyl chloride (c) KCl (d) NaCl
12. LAH is useful reagent for reduction ofcompounds.
(a) Carbonyl (b) Aromatic (c) Paraffinic (d) Olefinic
13. The compound to be synthesized is.....
(a) FGI (b) Anion (c) synthetic equivalent (d) target molecule
14. Cyclohexanol on FGI (Functional group interconversion) gives-----
(a) Cyclohexane (b) Cyclohexene (c) Cyclohexanone (d) All of these
15. The primary amines can be prepared by -----
(a) Baeyer villiger oxidation (b) Hofmann bromamide reaction
(c) Wittig reaction (d) Diels-Alder reaction
16. An antipyretic is a drug used to.....,
(a) control sleep (b) induce sleep (c) lower body temperature
(d) elevate body temperature.
17. The reagent used in MPV reduction is,
(a) LAH (b) DCC (c) Al(OHMe)₂ (d) Ph₃P=CRR
18. Detection of N-methyl group of alkaloid is done by.....
(a) Emde's (b) Herzig-Meyer method (c) Hoffinans (d) Ziesel method

19. Benzyl cyanide and diethyl carbonate are needed to synthesize.....,
(a) benzocaine (b) ethambutol (c) phenobarbitone (d) D (-) chloromycetin.

20. Pi bonds are.....than sigma bonds
(a) weaker (b) shorter (c) elimination (d) stronger

Q. 2 Attempt any two of the following [20]

1. What are the qualities of Ideal drugs? Give the synthesis of following drugs

(a) Benzocaine (b) Paludrine

2. How will you establish the structure of Nicotine on the basis of analytical evidence ?

3. a) Give the method of preparation of SeO_2 and its two applications.

b) What is meant by retrosynthesis? Define the following terms

1) Disconnection 2) Synthons 3) Synthetic equivalent 4) FGI

4. a) What are alkenes? Describe general mechanism of electrophilic addition to

$>\text{C}=\text{C}<$ bond.

b) Give the preparation and two synthetic applications of Osmium tetroxide.

5. a) What are terpenoids? How do you find the nature of oxygen atom in a terpenoid?

b) Explain the utility of Hofmann's exhaustive methylation to find the nature of

heterocyclic ring system in an alkaloids.

6. a) What are drugs? Which qualities are expected in good drug?

b) Define retrosynthesis? Explain one group disconnection approach in p-

hydroxy acetophenone.

7. What are the qualities of ideal drugs? Give the synthesis of following drugs

(a) Ethambutal (b) Isoniazide

8. How will you establish the structure of Citral on the basis of analytical evidence ?

9. a) Give the method of preparation of Lithium aluminium hydride and its two applications.

b) What is meant by retrosynthesis? Define the following terms

1) Disconnection 2) Synthons 3) Synthetic equivalent 4) FGI

10. a) Explain with mechanism when 2-methyl propene reacts with HBr in the presence of peroxide.

b) Explain the hydroxylation of alkene by KMnO_4

11. What are alkaloids? How are they classified? Describe the general methods of

extractions of alkaloids from natural sources.

12. Give the classification of drugs based on functional groups.

13. Give the mechanism of following rearrangement reactions

a) Wittig reaction b) Hoffmann reaction

14. Give the synthesis and applications of following reagents

a) Lithium Aluminium hydride b) Osmium tetroxide

15. What is Ozonolysis ? Explain the mechanism of addition of O_3 molecule to 2-

Butene and 1-Butene.

Q.3 Solve any Three of the following

- a) Explain Wagner Meerwein rearrangement with its mechanism
- b) State and explain Isoprene Rule
- c) Give synthesis and use of Ethambutol
- d) Why terminal alkynes are acidic in nature ? Explain with reactions.
- e) Explain the retrosynthetic pathway and synthesis of Paracetamol.
- f) Addition of HBr to propene with mechanism
- g) Wittig reaction
- h) Synthesis of Citral
- i) Explain the retrosynthetic pathway with respect to Cinnamaldehyde.
- j) Hydrogenation reaction in Alkyne
- k) Addition of bromine to propene with mechanism
- l) Diels- Alder reaction
- m) Synthesis of Nicotine
- n) Explain the retrosynthetic pathway and synthesis of Cyclohexene
- o) Metal Acetylides
- p) Markovnikoff's Rule
- q) Peroxide effect
- r) Chemotherapeutic agents
- s) Sulpha drug
- t) Synthon
- u) Disconnection approach

1. Addition of anhydrous AlCl_3 to lithium hydride slurry in dry ether gives.....
(a) DCC (b) ether (c) LAH (d) THF
2. Lithium Aluminum Hydride (LAH) is acting as ----- agent
(a) Oxidising (b) Reducing (c) Dehydrating (d) Hydroxylating
3. LAH cannot be used in presence of thesolvent,
(a) Protic (b) ether (c) dioxane (d) THF
4. The SeO_2 reagent is mainly used to oxidize the ----- position
(a) Allylic (b) Benzylic (c) Both a & b (d) Neither a nor b
5. Raney nickel is prepared by dissolving a block of Ni-Al alloy in.....
(a) aquaria (b) Conc. Na_2CO_3 (c) 5M NaOH (d) conc. H_2SO_4
6. Diazomethane reacts with aldehyde to give.....
(a) higher aldehyde (b) methyl ketone and some epoxide
(c) higher ketone (d) both a and b

7. The reagent used in MPV reduction is,
(a) LAH (b) DCC (c) $\text{Al}(\text{OHCMe}_2)_3$ (d) $\text{Ph}_3\text{P}=\text{CRR}'$
8. The primary amines can be prepared by -----
(a) Baeyer villiger oxidation (b) Hofmann bromamide reaction
(c) Wittig reaction (d) Diels-Alder reaction
9. The reagent used in Wittig reaction is.....
(a) $\text{Ph}_3\text{P}=\text{CRR}$ (b) LAH (c) DCC (d) $\text{Al}(\text{OHCMe}_2)_3$
10. The imaginary fragment product by a disconnection is.....
(a) synthetic equivalent (b) cation (c) synthon (d) anion
11. The compound to be synthesized is.....
(a) FGI (b) Anion (c) synthetic equivalent (d) target molecule
12. Cyclohexanol on FGI (Functional group interconversion) gives-----
(a) Cyclohexane (b) Cyclohexene (c) Cyclohexanone (d) All of these
13. Preparation of cyclohexane from butadiene and ethylene is.....
(a) Grignard reaction (b) dehydration reaction
(c) wittig reaction (d) Diels- alder reaction
14. An α - β unsaturated aldehyde can be prepared by.....
(a) dehydration (b) dehydration of aldol (c) oxidation (d) dehydrogenation
15. Synthetic equivalent of alkyl anion is a----
(a) Grignard reagent (b) wittig reagent (c) Tollen's reagent
(d) Nessler's reagent
16. The reaction of ester with excess of Grignard reagent will lead to...
(a) primary alcohol (b) secondary alcohol
(c) tertiary alcohol (d) ketone
17. Nitration of phenol gives mixture of ortho & para nitro phenol, from

this mixture ortho compound is separated by.....

- (a) fractional distillation
- (b) steam distillation
- (c) evaporation
- (d) recrystallization

18. 1,3 butadiene in presence of U. V. light gives cycobutene .This is example of.....reaction.

- (a) cycloaddition
- (b) electrocyclic
- (c) elimination
- (d) cyclohexane

19. The double or triple bonded compounds undergo reactions termed as.....

- (a) electrophilic substitution
- (b) electrophilic addition
- (c) Nucleophilic substitution
- (d) Nucleophilic addition

20. Pi bonds are.....than sigma bonds

- (a) weaker
- (b) shorter
- (c) elimination
- (d) stronger

21. Hydrogenation of alkenes forms,

- (a) alkanes
- (b) alicyclic.
- (c) alkyl halides
- (d) both b & c

22. Addition of halogen across a $>C=C<$ bond produces,.....

- (a) vicinal dihalide
- (b) alkyl halide
- (c) geminal dihalide
- (d) Alkanes

23. Addition of water across a double bond is called,

- (a) hydroxylation
- (b) hydrogenation
- (c) hydration
- (d) oxidation

24. Unsymmetrical triple bonded compounds undergo addition of H_2O and forms ----

- (a) Carboxylic acid
- (b) Alcohols
- (c) Aldehydes and Ketones
- (d) Ethers

25. Compounds containing pi-bonds on ozonolysis form,.....

(a) aldehyde (b) ketone (c) carboxylic acids (d) any or mixture of these

26. Addition of halogens to triple bond hydrocarbon gives,

- (a) dihaloalkane
- (b) alkyl halide
- (c) tetrahalo alkane
- (d) vicinal dihalide

27. Catalytic hydrogenation of alkynes finally yields,
(a) alkene (b) alkane & alkene mixture (c) alkane (d) Phenols
28. Propene on addition of HBr (Hydrobromination) produces ----- as major product
(a) 1-bromopropane (b) 2-bromopropane (c) 1,2 dibromopropane (d) Alcohols
29. In presence of Hg(II) catalyst water adds to terminal alkynes to form,
(a) enol (b) ketone (c) first enol then ketone (d) aldehyde
30. Addition of water to unsymmetrical alkynes yield,
(a) carboxylic acids (b) aldehydes & ketones (c) alcohols (d) ketone
31. Terpenoids are,.....
(a) water insoluble (b) steam volatile (c) odourous (d) all of these
32. Citral is ,.....
(a) an aldehyde (b) acyclic (c) found in lemon grass oil (d) all of these
3. Citral consumes ---- molecules of ozone during ozonolysis to form a mixture of
acetone, laevualdehyde and glyoxal
(a) 2 (b) 1 (c) 3 (d) 4
34. Alkaloids are in general,.....
(a) sparingly soluble or insoluble in water (b) colourless (c) basic, nitrogenous
(d) all of these
35. The alkoxy group of alkaloid is detected and estimated by,
(a) Ziesel method (d) Emde's (b) Herzig-Meyer method (c) Hoffmann's
(d) all of these

- (a) isoniazide (b) penicillin (c) ethambutol (d) paludrine
48. Pulmonary tuberculosis is treated with,.....
- (a) ethambutol (b) benzocaine (c) isoniazide (d) both a & c
49. Ethambutol synthesis begins with reaction between,.....
- (a) nitropropane & formaldehyde (b) diethyl carbonate & benzyl cyanide
(c) p-methyl pyridine (d) p-nitroacetophenone

Q.2 Solve the following

[20]

I) i) With respect to C=C bond explain the following reactions

(a) Ozonolysis (b) Hydrohalogenation

ii) What are alkenes? Describe mechanism of electrophilic addition to C=C bond

II) Give the preparation and two synthetic applications of

a) Raney Nickel

b) Osmium tetroxide (OsO_4)

c) DCC

d) LAH

III) i) What are terpenoids? How do you find the functional form of oxygen in a terpenoid?

ii) What are alkaloids? How do you find the $-\text{OCH}_3$ group in an alkaloid?

IV) i) Explain the utility of Hofmann's exhaustive methylation to find the nature of heterocyclic ring system in an alkaloid

ii). Give the synthesis of nicotine

V) i) What are drugs? Which qualities are expected in a good drug?

ii) Explain drug action of sulpha drug

VI) a) What is meant by retrosynthesis? Explain the following terms with suitable example

1) Disconnection 2) Synthons 3) Synthetic equivalent 4) FGI

b) Comment on one group disconnection with suitable example

Q.3 Solve any Three of the following

[12]

I) Explain following reaction with its mechanism.

(i) Diels-Alder reaction

(ii) M. P. V. reduction

(iii) Wagner-Meerwein rearrangement

(iv) Wittig reaction

II) State and explain

i) Isoprene Rule

ii) Functional nature of Nitrogen in alkaloid

iii) Special Isoprene Rule

III) Give synthesis and use of

i) Paludrine

ii) Isoniazide

iii) Ethambutol

IV) i) With respect to alkynes explain the following reactions,

(a) Hydration (b) Halogenation

(c) Hydrohalogenation (d) Catalytic hydrogenation

ii) Why terminal alkynes are acidic in nature ? Explain with reactions

V) Explain the retrosynthetic pathway and synthesis of following target molecule

1) Cyclohexene 2) Paracetamol 3) p-Hydroxy acetophenone 4) t-butyl alcohol
