"Dissemination of Education for Knowledge, Science and Culture"

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NAAC Reaccrediated : "B" (Third Cycle)

Department of Chemistry

B. Sc. I Sem. - I Paper No. II (Organic Chemistry)

Q.1 MCQ-

1) Homolytic bond fission is favoured by……
   A) uv-light B) heat
   C) Polar solvent D) both A and B

2) Electrophiles are ……
   A) electron loving B) nucleus loving
   C) electron hating D) nucleus hating

3) The nucleophile amongst the following species is ……
   A) H^+ B) H_3O^+
   C) $ZnCl_2$ D) R-NH_2

4) Restricted rotation can be shown by the systems…….
   A) >C=C< B) >C=N-
   C) alicyclic D) Any of these

5) Stability of carbanion is……
   A) $3^0 > 2^0 > 1^0$ > methyl B) methyl>1^0 > 2^0 >3^0
   C) 1^0 > 2^0 >3^0> methyl D) methyl>3^0 > 2^0 >1^0

6) In electromeric effect complete transfer of ……..
   A) sigma B) pi
   C) both A and B D) none of these

7) The electron withdrawing inductive effect is known as……..
   A) –I effect B) +I effect
   C) both A and B D) none of these

8) …… is the least stable carbocation.
   A) CH_3-CH_2^+ B) CH_3^+
   C) C_6H_5-CH_2^+ D) $(CH_3)_3C^+$

9) The electron donating inductive effect is known as……..

A) –I effect B) +I effect
C) both A and B D) none of these

10) Negatively charged trivalent carbon species is …….
A) Carbanion B) carbocation
C) Free radical D) carbene

11) If the like groups stay opposite sides of the vertical line then it is called the… ...form.
A) Erythro B) Threo
C) Both a and b D) None of these

12) The compound having optical activity amongst the following is ……...
A) 1-chlorobutane B) 2-chloropropane
C) 2-chlorobutane D) 1-chloropentane

13) An optically active molecule lacks… …..of symmetry.
A) Plane B) Centre
C) Alternating axis D) All of these

14) A pair of non-superimposable mirror images of an optically active compound is called as….. …….
A) Enantiomers B)Diastereomers
C) Stereoisomers D) None of these

15) An optically active molecule lacks…….of symmetry.
A) Centre B) Plane
C) Alternating axes D) all of these

16) In maleic acid, the two -COOH groups are on… …. side of double bond.
A) same B) Different
C) Constant D) None of these

17) One isomer that rotates the plane polarized light to right side is called…. ….
A) Dextrorotatory B) Laevorotatory
C) Both a and b D) None of these

18) Tartaric acid exists……. ...number of stereoisomers.
A) Three B) Four C)Two D) five

19) Any cyclic, planar and fully conjugated molecule containing (4N+2) π-electrons is ……..
A) Non aromatic B) antiaromatic
C) aromatic D) pseudoaromatic

20) In benzene C=C bond distance is ……..
A)1.39 A° B) 1.54 A° C) 1.34 A° D) 1.20 A°

21) In Chlorination of benzene, which of the following acts as an electrophile?
A) Cl^+ B) Cl^- C) Cl D) $FeCl_3$

22) The number of delocalised $\boldsymbol{\pi}$ electrons in the benzene ring are……
A) 6 B) 8 C) 2 D) 4

23) Benzene is aromatic while …….. is non-aromatic .
A) Pyridine B) cyclopentadiene
C) cyclopropene cation D) anthracene

24) Which of the following is the reactive species in the nitration of benzene?
A) NO_2^+ B) NO_2^- C) NO_3 D) HNO_3

25) The product formed, when benzene reacts with CH_3COCl in the presence of $AlCl_3$ is…….
A) $C_6H_5CH_3$ B) C_6H_5Cl
C) $C_6H_5COCH_3$ D) C_6H_5COCl

26) Tartaric acid exists……. ...number of stereoisomers.
A) Three B) Four C)Two D) five

27) Heterolytic covalent bond fission yields ……
A) pair of free radicals B) pair of cations
C) Pair of anions D) one each of cation & anion

28) Nucleophiles are …….
A) Electron loving B) nucleus loving
C) Electron hating D) nucleus hating

29) Electrophiles are …….
A) Lewis base B) Lewis acid
C) Both A and B D) none of these

30) The symmetrical or even breaking of a covalent bond is called as ……..fission.
A) Homolytic B) heterolytic
C) Both A and B D) none of these

31) The nucleophile amongst the following species is ……
A) H^+ B) H_3O^+
C) $ZnCl_2$ D) $R\text{-}NH_2$

32) The electron withdrawing inductive effect is known as…….. A) –I effect
B) +I effect
C) both A and B D) none of these

33) Stability of carbocation is……
A) $3^0 > 2^0 > 1^0 >$ methyl B) methyl$> 1^0 > 2^0 > 3^0$
C) $1^0 > 2^0 > 3^0 >$ methyl D) methyl$> 3^0 > 2^0 > 1^0$

34) Electromeric effect is …… effect.
A) Permanent B) temporary
C) Time variable D) both A and C

35) Restricted rotation can be shown by the systems…….
A) >C=C< B) >C=N-
C) alicyclic D) Any of these

36) Negatively charged trivalent carbon species is …….
A) Carbanion B) carbocation
C) Free radical D) carbine

37) A chiral centre is attached to CH3, OH, CI and SO3H groups. So the priority order of these groups is……..
A) CH3 > OH >Cl> SO3 B) OH >Cl> CH3 > SO3H
C) SO3H > CI > OH > CH3 D) SO3H > OH >CI > CH3

38) The compound having optical activity amongst the following is ……...
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C) 2-chlorobutane D)1-chloropentane

39) A pair of non-superimposable mirror images of an optically active compound is called as….. …….
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45) The product formed, when benzene reacts with CH_3COCl in the presence of $AlCl_3$ is……..
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C) $C_6H_5COCH_3$ D) C_6H_5COCl

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48) Any cyclic , planar and fully conjugated molecule containing (4N+2) π-electrons is ……..
A) Non aromatic B) antiaromatic
C) aromatic D) pseudoaromatic

49) In benzene C=C bond distance is ……..
A) 1.39 A° B) 1.54 A° C) 1.34 A° D) 1.20 A°

50) Benzene is aromatic while …….. is non-aromatic .
A) Pyridine B) cyclopentadiene
C) cyclopropene cation D) anthracene

Long answer type questions

1. What is carbocation? Give any two methods of preparation of carbocation. Explain structure and stability of carbocation.

2. Define carbanion. Give methods of generation, stability and reactivity of carbanions.

3. What are free radicals? Discuss the preparation of free radicals. Explain reaction with olefins of free radicals.

4. What is geometrical isomerism? Explain the phenomenon with respect to oximes.

5. Discuss stereoismerism in 2-butene dioic acid.

6. Expalin optical isomerism in tartaric acid.

7. What is Friedel-Crafts reaction? Discuss its mechanism.

8. Explain the general mechanism involved in electrophilic substitution of benzene.

9. What are cycloalkanes? How will you prepare cyclobutane by different methods? What is the action of following reagents on cyclopropane (a) Bromine (b) Hydrogen in presence of catalyst (c) Hydrogen Chloride?

10. What are dienes? How butadiene is prepared by different methods? What happens when butadiene is treated with (a) HCl (b) halogen (c) ethene (d) ozone?

Short answer type questions

1. Explain the term homolysis with suitable example.

2. Explain the heterolytic cleavage of covalent bond with suitable example.

3. Write a short note on inductive effect and resonance.

4. Write short note on resonance and hyperconjugation.

5. Why allyl carbocation is more stable than propyl carbocation.

6. Give the conditions necessary for a molecule to show optical activity.

7. Explain the terms (i) Geometrical isomers and (ii) Plane of symmetry with examples.

8. Define and illustrate the terms (i) Stereoismers and (ii) Diastereomers with examples.

9. Draw the possible stereoisomers of the following compounds and assign absolute configuration to each of them-

(i) $CH_3.CH.(CN).CH_2.CH_3$ (ii) $CH_3.CH_2.CH.(Cl).CH_3$

10. State with reasons whether the following compounds show geometrical isomerism or not.

(i) $CH_3C(OH)=C(CH_3)_2$ (ii) $(CH_3)C_2H_5C=C(C_2H_5)_2$

11. What is Huckel's rule of aromaticity? Explain with respect to Naphthalene.

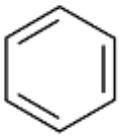
12. Define anti-aromatic compound with suitable example.

13. Draw resonance structures of benzene.

14. Explain the terms (i) Non-aromatic and (ii) Antiaromatic.

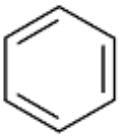
15. Complete the following reactions-

(i)



+ H_2SO_4 $\xrightarrow[\text{Conc. } H_2SO_4]{}$? ?

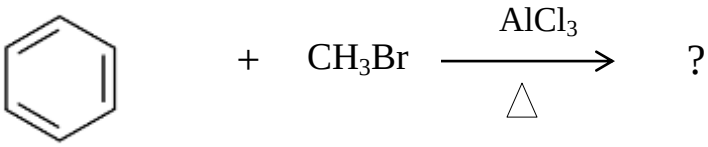
(ii)



+ HNO_3 $\xrightarrow[50\text{-}60^0C]{}$

(iii)

(iv)



16. Write note on Diels-Alder reaction.

17. How is butadiene prepared? Give its chemicals properties.

18. Write the structure of 1:3 butadienes. Explain why it is more stable than expected.

19. Give any two methods of preparation and chemical properties of cycloalkanes.

20. Give any two methods of preparation and chemical properties of cycloalkenes.