DEPARTMENT OF CHEMISTRY

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

B.TECH (2018-2019)

Subject/Code: Chemistry/ 18CYB101J **Semester-I**

MODULE V

1. Select the **incorrect** statement from the following option.

   a) Racemic modification is an equimolar mixture of dextrorotatory and levorotatory isomers

   b) Meso compounds contains more than one chiral carbon centre

   c) Meso compounds are externally compensated

   d) Racemic mixture is designated as dl-pair

   [Explanation: Meso compounds are internally compensated form whereas racemic mixtures are externally compensated modification. All the other options are correct.]

2. How many optical isomers are possible in a compound with one chiral carbon?

   a) 5

   b) 4

   c) 2

   d) 3

   [Explanation: A compound with one chiral carbon has three optical isomers (+), (-) and (±).]

3. Which of the following compound would show optical isomerism?

   a) CH_3 – CH(OH) COOH

   b) H_2N $CH(CH_3)_2$

c) $(CH_3)_2$ CHCHO

d) H_2N CH_2 COOH

4. The number of configurational isomers of molecules having (n) different chiral carbons is

   a) 2n

   b) 2^n

   c) 2^{n-1}

   d) 2^{n+1}

5. The number of racemic forms of molecules having (n) different chiral carbons is

   a) 2n

   b) 2^n

   c) 2^{n-1}

   d) 2^{n+1}

6. For a molecule with two like chiral carbon atoms, the number of optically inactive form is

   a) 1

   b) 2

   c) 3

   d) 4

7. For a molecule with two like chiral carbon atoms, the number of optically active form is

   a) 4

   b) 3

   c) 1

   d) 2

8. Find the number of stereoisomers for $CH_3 – CHOH – CH = CH – CH_3$.

   a) 1

   b) 2

   c) 3

   d) 4

   [Explanation: The number of stereoisomers for $CH_3 – CHOH – CH = CH – CH_3$ is four. This is calculated by the formula 2^{n+1}.]

9. Which of the following is an example of optically active compounds without chirality?

   a) Tartaric acid

   b) Sulfhonium salt

   c) Diphenic acid

   d) Glyceraldehyde

   [Explanation: Sulphhonium salt is an example of optically active compounds without chirality. It is a special case. There are various such molecules which are optically active compounds without chirality.]

10. Which of the following is not optically active compound?

    a) 1,7- Dicarboxylicspirocycloheptane

    b) 1,3- Diphenylpropadiene

    c) Meso-tartaric acid

    d) Glyceraldehyde

    [Explanation: Meso-tartaric acid is optically inactive molecule with chiral carbon atom. It is a special case of optical activity.]

11. Reaction of (±) 2,3- dibromobutane is slower than meso in which the two methyl groups are

a) Skew

b) Anti

c) Gauche

d) Partially eclipsed

12. The infinity of intermediate conformations are called

a) Skew conformations

b) Staggered conformations

c) Eclipsed conformations

d) Gauche

13. The potential energy of n-butane is minimum for

a) Skew conformations

b) Staggered conformations

c) Eclipsed conformations

d) Gauche

[Explanation: The potential energy of n-butane is minimum for staggered conformations. It is because of no steric hindrance.]

14. The potential energy of n-butane is maximum for

a) Skew conformations

b) Staggered conformations

c) Eclipsed conformations

d) Gauche

[Explanation: The potential energy of n-butane is maximum for eclipsed conformations. It is because of overlapping of functional groups.]

15. The relative instability of any of the intermediate skew conformations is due to

a) Lateral strain

b) Shear strain

c) Longitudinal strain

d) Torsional strain

16. In gauche conformations, the methyl groups are

a) 60^0 apart

b) 90^0 apart

c) 180^0 apart

d) 360^0 apart

17. Which of the following is least stable?

a) Anti conformation

b) Gauche conformation

c) Staggered conformation

d) Eclipsed conformation

18. The halide ion is an extremely

a) Weak base

b) Weak acid

c) Strong base

d) Strong acid

19. When the nucleophile :OR attacks the RX, the resultant product will be

a) R – OH

b) ROR

c) R:CN

d) RNHR

20. The reactivity order of alkyl halides in S_N2 is

a) CH_3 X > 1^0> 2^0> 3^0

b) CH_3 X > 2^0> 1^0> 3^0

c) CH_3 X > 3^0> 1^0> 2^0

d) CH_3 X > 3^0> 2^0> 1^0

21. Which step in S_N1 reaction is a slow rate determining step?

a) Attack of nucleophile

b) Formation of racemic mixture

c) Formation of transition state

d) Both a and b

22. A low concentration of nucleophile favours the

a) S_N2 mechanism

b) S_N1 mechanism

c) Both a and b

d) E1 mechanism

23. Which of the following reactions are favoured by polar aprotic solvent?

a) S_N1 mechanism

b) S_N2 mechanism

c) Both a and b

d) E1CB mechanism

24. Arrange the following in the decreasing order of leaving group in nucleophilic substitution reaction.

a) H^->Cl^-> HO^-> Br^-> CH_3COO^-

b) Cl^-> Br^-> HO^-> H^-> CH_3COO^-

c) Cl^-> Br^-> CH_3COO^-> HO^-> H^-

d) HO^-> CH_3COO^-> H^-> Br^->Cl^-

25. Which of the following is rate determining step in electrophilic substitution reaction?

a) Generation of electrophile

b) Attack by an electrophilic reagent on benzene ring

c) Formation of product

d) both a and c

26. Which of the following act as electrophile in halogenation?

a) Nitronium ion

b) Sulphonium ion

c) Halonium ion

d) Acylium ion

[Explanation: Halonium ion act as electrophile in halogenation. Nitronium ion is used in nitration. Sulphonium ion is used in sulphonation. Acylium ion is used in acylation.]

27. What type of reaction takes place upon treatment of a ketone with HCN to form a cyanohydrin?

a) Nucleophilic addition

b) Nucleophilic substitution

c) Electrophilic addition

d) Electrophilic substitution

28. Identify the compound with the highest ring strain

a) Cyclomethane

b) Cyclopropane

c) Cyclobutane

d) Cyclopentane

29. Which of the following statements is correct for alkyl halide?

a) Alkyl halide will always show S_N1 mechanism

b) As branching at carbon increases, E1 mechanism is favoured as compared to S_N1 mechanism

c) In unimolecular reaction, increasing the temperature donot favours E1 mechanism

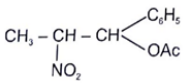
d) In most unimolecular reactions of alkyl halide E1 reaction is favoured over SN1 reaction

30. Which of the following compounds cannot give E_1CB reaction?

a) $CF_3 - CHCl_2$

b) $C_6H_5 - CH_2 - CH_2F$

c) $CH_3 - CH_2 - CH_2Br$

d) 

Ans : d) Compound d will give E2 reaction, Br is a better leaving group so formation of carboanion and removal of leaving group occurs simultaneously. But E_1CB reaction is shown by poor leaving group like in compounds a, b and c.

31. Which of the following is an initiator molecule in the free radical polymerisation?

a) Benzoyl peroxide

b) Sulphuric acid

c) Potassium permanganate

d) Chromium oxide

32. When the nucleophile RO^- attacks the RX, the resultant product will be

a) ROH **(b) ROR** (c) RCN (d)RNHR

33. Losing of small molecule from original organic molecule is

a) **Elimination reaction** (b) Substitution reaction (c) Addition reaction (d) Both A and D

34. $[Co(NH_3)_6][Cr(C_2O_4)_3]$ and $[Cr(NH_3)_6][Co(C_2O_4)_3]$ is an example for(b

a) **Coordinationisomerism** (b) Ionisation isomerism (c) hydrate isomerism (d) linkage isomerism

35. In a free radical reaction, free radicals are formed at

(a) Initiation step (b) propagation step (c) termination step **(d) both A and B**

36. An acceptor of pair of electron is termed as

a) Nucleophile **(b) electrophile** (c) carbocation (d) Anion

37. Identify the one which does not come under the organic addition reaction

a) Hydration **b) Dehydration** c) Halogenation d) Hydrohalogenation

38. Markovnikov's law is applied in

a) Addition of propylene with Cl_2 **(b) addition of propylene with HBr**

(c)addition of ethylene with Br2 (d) addition of ethylene with HCl

39. Drugs that are used to diagnose, cure and prevent disease are called

a) **pharmaceutical drugs**

b) addictive drugs

c) industrial drugs

d) single cell drugs

40. Which of the following would exhibit co-ordination isomerism?

a)$[Cr(NH_3)_6][Co(CN)_6]$

b) $[Co(en)_2Cl_2]$

c) $[Cr(NH_3)_6]Cl_3$

d) $[Cr(en)_2Cl_2]+$

41. $[Co(NH_3)_5NO_2]Cl_2$ and $[Co(NH_3)_5(ONO)]Cl_2$ are related to each other as

a) Geometrical isomers

b) Optical isomers

c) Linkage isomers

d) Coordination isomers

44. Exchange of co-ordination group by a water molecule in complex molecule results in

(a) Ionization isomerism

(b) Ligand isomerism

(c) Hydration isomerism

(d) Geometrical isomerism

45. The major product formed in the reaction of  with HBr is

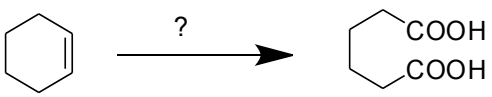
a) $CH_3\text{-}CH_2\text{-}CH_2\text{-}CH_2\text{-}I$ with CH_3 branch

b) $CH_3\text{-}CH(I)\text{-}CH_2\text{-}CH_3$ with CH_3 branch

c) **$CH_3\text{-}CH_2\text{-}C(I)(CH_3)\text{-}CH_3$**

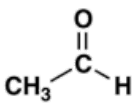
d) $CH_3\text{-}CH_2\text{-}CH{=}CH_2 + CH_3I$ with CH_3 branch

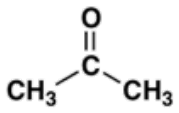
46. The most suitable reagent for the following transformation is

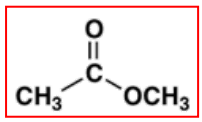


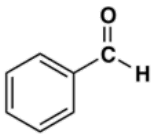
a. **$KMnO_4$** b) OsO_4 c) $K_2Cr_2O_7$ d) PCC

47. Which is unreactive in hydride reduction with $NaBH_4$?

a) 

b) 

c) 

d) 

48. The ionisation isomer of $[Cr(H_2O)_4Cl(NO_2)C]$ is
    a) $[Cr(H_2O)_4(O_2N)]Cl_2$
    b) **$[Cr(H_2O)_4Cl_2](NO_2)$**
    c) $[Cr(H_2O)_4Cl(ONO)Cl$
    d) $[Cr(H_2O)_4Cl_2(NO_2)]\ H_2O$

49. Which would exhibit co-ordination isomerism?

    a) $[Cr\ (NH_3)_6)]$ $[Co\ (CN)_6]$ b) $[Co(en)_2Cl_2]$ c) $[Cr(NH_3)_6]Cl_3$ d) $[Cr(en)_2Cl_2]$

50. Nucleophilic substitution near takes place when halogeno alkanes is added with aq. solution of

    a) NaCl b) Sodium manganate **c) NaOH** d)Na chlorate

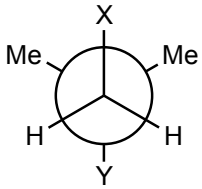
51. Identify reducing agent the following

    a) $OS\ O_4$ b) PCC **c) LiAlH4** d) $K_2Cr_2O_7$

52. Drugs that are used to disguised, cure and prevent disease are called------

    a) **Pharmaceutical drugs** b) Addictive drug c)Industrial drugs d) single cell drugs

53. In the Newmann projection of 2-dimethyl butane



a) H and CH3 b) CH3 and CH3 c) H and C_2H_5 **d) Both b and c**

54. Oxidation of phenol to catechol takes place by one of the following

a) H_2O_2 b) O_2 **c) $KMnO_4$** d) CrO_3

55. Which of the following oxidises primary alcohols to carbonyl compounds without affecting the double bond?

a)MnO_2/H_2O_2 b) CrO_3/H_2SO_4 c) MnO_2/CH_2Cl_2 d) H_2SO_4