

ORGANIC CHEMISTRY

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES AND TECHNIQUES

1. SUB TOPIC NAME: GENERAL INTROUCTION

- The first organic compound prepared from inorganic compounds was
 - 1) Urea
 - 2) methane
 - 3) acetic acid
 - 4) ethyl alcohol
- The bond energy (in K Cal mol⁻¹) of a C-C single bond is approximately
 - 1) 1
 - 2) 10
 - 3) 100
 - 4) 1000
- Which of the following represents the given mode of hybridization sp² – sp² – sp – sp from left to right?
 - 1) H₃C – CH = CH – CH₃
 - 2) HC ≡ C – C ≡ CH
 - 3) H₂C = CH – C ≡ CH
 - 4) H₂C = CH – CH = CH
- Considering the state of hybridization of carbon atoms, find out the molecule among the following which is linear?
 - 1) CH₃ – C ≡ C – CH₃
 - 2) CH₃ – CH = CH – CH₃
 - 3) H₂C = CH – CH₂ – C ≡ CH
 - 4) CH₃ – CH₂ – CH₂ – CH₃
- The compound in which all carbon atoms use only sp³ hybrid orbitals for bond formation is
 - 1) CH₃CHO
 - 2) CH₃COCH₃
 - 3) (CH₃)₃COH
 - 4) HCOOH
- Which among the following has highest melting point?
 - 1) (CH₃CO)₂O
 - 2) CH₃CN
 - 3) CH₃CONH₂
 - 4) CH₃CoCl
- The correct order regarding the electro negativity of hybrid orbitals of carbon is
 - 1) sp < sp² > sp³
 - 2) sp < sp² < sp³
 - 3) sp > sp² > sp³
 - 4) sp > sp² < sp³
- Among the following mixtures, dipole – dipole as the major interaction is present in
 - 1) Benzene and ethanol
 - 2) acetonitrile and acetone
 - 3) KCl and water
 - 4) benzene and carbon tetra chloride
- Match the following

Column – I	Column – II (hybrid, pure orbitals)
A) C ₂ H ₆	p) 18, 12
B) C ₂ H ₄	q) 8, 0
C) C ₂ H ₂	r) 6, 6
D) C ₆ H ₆	s) 4, 6
1) A-s, B-q, C-p, D-r	2) A-r, B-p, C-q, D-s
3) A-q, B-r, C-s, D-p	4) A-p, B-s, C-q, D-r
- A: p-hydroxy benzoic acid has a lower boiling point than O-hydroxy benzoic acid**

R: O-hydroxy benzoic acid has intra molecular hydrogen bonding.

 - 1) Statement – 1 (A) and statement-2 (R) are true and statement – 2 is the correct explanation for statement – 1(A)
 - 2) Statement – 1 (A) and statement-2 (R) are true and statement – 2 is not the correct explanation for statement – 1(A)
 - 3) Statement – 1 (A) is true, statement-2 (R) is false
 - 4) Statement – 1 (A) is false, statement-2 (R) is true
- The hydrogen bond is strongest in which one of the following
 - 1) F – H F
 - 2) O – H O
 - 3) S – H F
 - 4) F – H O

12. Which of the following compounds shows evidence of the strongest hydrogen bonding ?

- 1) Propane – 1, 2, 3 – triol 2) Propane – 1, 2 – diol
3) Propan – 1- ol 4) Propan – 2 – ol

13. Which one of the following is the hetero cyclic compound?

- 1) Pyrene 2) Thiophene 3) Phenol 4) Anilene

14. Which one of the following is a non-benzoid aromatic compound?

- 1) Anthracene 2) Tropolone 3) Aniline 4) Naphthalene

15. Which one is not correct for a homologous series?

- 1) All members have a general formula
2) All members have same chemical properties
3) All members have same physical properties
4) All members have same functional group

16. Match the following

List – I

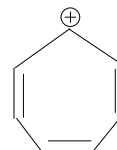
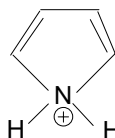
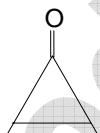
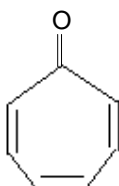
- 1) Benzene
2) Naphthalene
3) Anthracene
4) Pyridine
5) Cycloalkane

List – II

- A) Aromatic (Bicyclic)
B) Aromatic (monocyclic)
C) Alicyclic
D) Heterocyclic
E) Aromatic (Tricyclic)
1) 1-B, 2-A, 3-E, 4-D, 5-C 2) 1-A, 2-B, 3-C, 4-E, 5-D
3) 1-E, 2-D, 3-A, 4-C, 5-B 4) 1-D, 2-C, 3-B, 4-A, 5-E

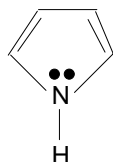
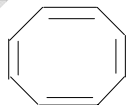
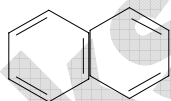
17. Choose the non aromatic compound among the following

- 1) 2) 3) 4)



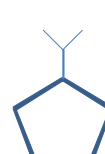
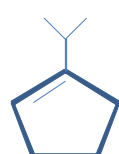
18. Identify the compounds in which all bond lengths are equal

- 1) 2) 3) 4)



19. Which of the following alkene has highest value of heat of hydrogenation?

- 1) 2) 3) 4)



20. Which of the following is not a planar molecule?

- 1) $H_2C = C = CH_2$ 2) $H_2C = C = C = CH_2$
3) $H_2C = C = O$ 4) $NC - HC = CH - CN$

KEY

- 1) 1 2) 3 3) 3 4) 1 5) 3 6) 3 7) 4 8) 2 9) 3 10) 4
 11) 1 12) 1 13) 2 14) 2 15) 3 16) 1 17) 3 18) 4 19) 4 20) 1

2. SUB TOPIC NAME: NOMENCLATURE OF ORGANIC COMPOUNDS

1. **The correct decreasing order of preference of functional groups during the IUPAC nomenclature of poly functional compounds is**

- 1) $-\text{COOH}$, $-\text{SO}_3\text{H}$, $-\text{CONH}_2$, $-\text{CHO}$ 2) $-\text{SO}_3\text{H}$, $-\text{COOH}$, $-\text{CONH}_2$, $-\text{CHO}$
 3) $-\text{CHO}$, $-\text{COOH}$, $-\text{SO}_3\text{H}$, $-\text{CONH}_2$ 4) $-\text{CONH}_2$, $-\text{CHO}$, $-\text{SO}_3\text{H}$, $-\text{COOH}$

2. **Which of the following is a correct name according to IUPAC rules ?**

- 1) 2, 3-dimethyl hexane 2) 3-ethyl-2-methyl pentane
 3) 3, 4-dimethyl pentane 4) 2-ethyl-2-methyl pentane

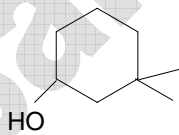
3. **The IUPAC name of**  **is**

- 1) 3-ethyl-4, 4-dimethyl heptanes 2) 1, 1-diethyl -2, 2-dimethyl pentane
 3) 4, 4-dimethyl-5, 5-diethyl pentane 4) 5, 5-diethyl -4, 4-dimethyl pentane

4. **The IUPAC name of**  **is**

- 1) 2-ethyl-3-methyl butanoyl chloride 2) 2, 3-dimethyl pentanoyl chloroide
 3) 3, 4-dimethyl pentanoyl chloride 4) 1-chloro-1-oxo-2, 3,-dimethyl pentane

5. **The IUPAC name of the compound**



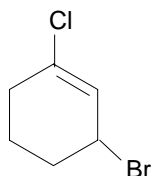
is

- 1) 3, 3-dimethyl-1-1hydroxy cyclohexane 2) 1, 1-dimethyl-3-hydroxy cyclohexane
 3) 3, 3-dimethyl-1-cyclo hexanol 4) 1, 1-diethyl -3 – cyclo hexanol

6. **The compound which contains all the four 1°, 2°, 3° and 4° carbon atom is**

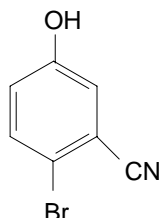
- 1) 2, 3-dimethyl pentane 2) 3-chloro-2, 3-dimethyl pentane
 3) 2, 3, 4-trimethyl pentane 4) 3, 3-dimethyl pentane

7. The IUPAC name of the compound shown below is



- | | |
|------------------------------------|---------------------------------|
| 1) 2-bromo-6-chloro cyclohex-1-ene | 2) 6-bromo-2-chloro cyclohexene |
| 2) 3-bromo-1-chloro cyclohexene | 4) 1-bromo-3-chloro cyclohexene |

8. The IUPAC name of the compound shown below is



- | | |
|------------------------------------|-----------------------------------|
| 1) 4-bromo-3-cyano phenol | 2) 2-bromo-5-hydroxy benzonitrile |
| 3) 2-cyano-4-hydroxy bromo benzene | 4) 6-bromo-3-hydroxy benzonitrile |

9. The IUPAC name of neopentane is

- | | |
|----------------------------|---------------------|
| 1) 2, 2 – dimethyl propane | 2) 2-methyl propane |
| 3) 2, 2-dimethyl butane | 4) 2-methyl butane |

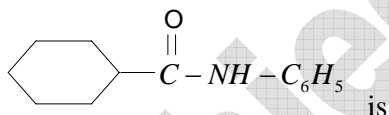
10. The IUPAC name of C_6H_5COCl is

- | | |
|------------------------------|--------------------------|
| 1) benzene acetic acid | 2) benzene chloro ketone |
| 3) benzene carbonyl chloride | 4) chloro phenyl ketone |

11. Systematic name of $Ph-CH_2-COOH$ is

- | | |
|---------------------------|----------------------------------|
| 1) Benzene acetic acid | 2) phenyl methyl carboxylic acid |
| 3) 2-phenyl ethanoic acid | 4) 2-phenyl methanoic acid |

12. The IUPAC name of

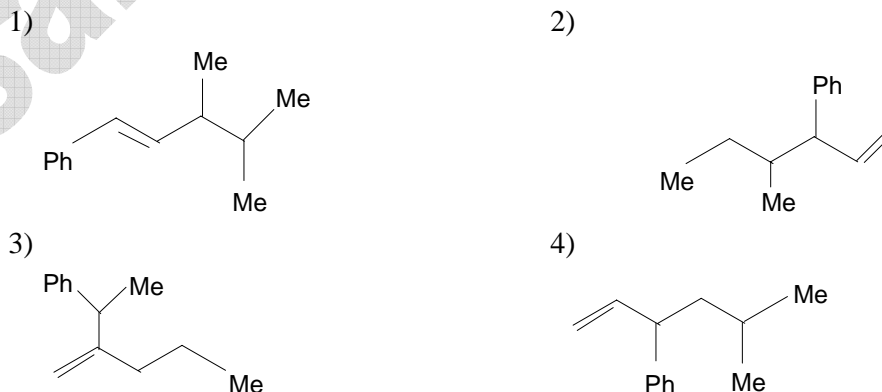


- | | |
|--------------------------------------|---------------------------------------|
| 1) N-cyclohexyl benzamide | 2) N-cyclohexyl-N-phenyl methyl amide |
| 3) N-phenyl-N-cyclohexyl methanamide | 4) N-phenyl cyclo hexane carboxamide |

13. Which of the following compounds has isopropyl group ?

- | | |
|-----------------------------------|--------------------------|
| 1) 2, 2, 3, 3-tetramethyl pentane | 2) 2, 2-dimethyl pentane |
| 3) 2, 2, 3-trimethyl pentane | 4) 2-methyl pentane |

14. Which one of the following is 5-butyl phenyl vinyl methane?



15. The general molecular formula which represents the homologous series of alkanol is

- 1) $C_nH_{2n+2}O$ 2) $C_nH_{2n}O_2$ 3) $C_nH_{2n}O$ 4) $C_nH_{2n+1}O$

16. The general formula $C_nH_{2n}O_2$ could be for open chain

- 1) Dialdehydes 2) diketones 3) carboxylic acids 4) diols

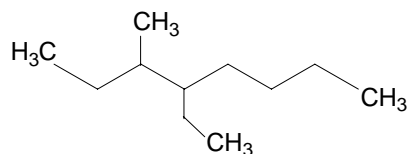
17. The IUPAC name of the compound having the formulae $HC \equiv C - CH = CH_2$ is

- 1) 1-butyne-3-ene 2) but-1-yne-3-ene 3) 1-butene-3-yne 4) 3-butene-1-yne

18. Give the IUPAC name for $CH_3CH_2O\overset{\overset{CH_3}{|}}{CH}CH_2CH_2CH_2Cl$

- 1) 2-ethoxy-5-chloro pentane 2) 1-chloro-4-ethoxy-4-methyl pentane
3) 1-chloro-4-ethoxy pentane 4) ethyl-1-chloropentyl ether

19. Name the compound given below is



- 1) 4-ethyl-3-methyl octane 2) 3-methyl-4-ethyl octane
3) 2, 3-diethyl heptane 4) 5-ethyl-6-methyl octane

20. Names of some compounds are given. Which one is not in IUPAC system

- 1) $CH_3 - CH_2 - CH_2 - \underset{\underset{CH_2-CH_3}{|}}{CH} - \overset{\overset{CH_3}{|}}{CH} - CH_2 - CH_3$: 3-methyl-4-ethyl heptane
2) $CH_3 - \underset{\underset{OH}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_3$: 3-methyl-2-butanol
3) $CH_3 - CH_2 - \underset{\underset{CH_2}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_3$: 2-ethyl-3-methyl bute-1-ene
4) $CH_3 - C \equiv CH (CH_3)_2$: 4-methyl-2-pentyne

KEY

- 1) 2 2) 2 3) 1 4) 2 5) 3 6) 2 7) 3 8) 2 9) 1 10) 3
11) 3 12) 4 13) 4 14) 2 15) 1 16) 3 17) 3 18) 3 19) 1 20) 1

3. SUB TOPIC NAME: PURIFICATION AND CHARACTERISATION OF ORGANIC COMPOUNDS

1. In the Lassaigne's test for the detection of Sulphur, the purple colour is due to the formation of

- 1) $Na_4[Fe(CN)_5NOS]$ 2) $Na_3[Fe(CN)_5S]$
3) $Na_2[Fe(CN)_5NOS]$ 4) $Na_3[Fe(CN)_6]$

2. **Cl – C₂H₄COOH is heated with fuming HNO₃ and then AgNO₃ is added in the test tube. The precipitate obtained is**
 - 1) AgCl, White coloured
 - 2) AgCl, Yellow coloured
 - 3) AgNO₃, AgCl White coloured
 - 4) Cl – C₂H₄ CoOAg, Yellow coloured
3. **In Lassaigne's test, the organic compound is fused with a piece of sodium metal in order to**
 - 1) Increase the ionization of the compound
 - 2) Increase the reactivity of the compound
 - 3) Convert the covalent compound into a mixture of ionic compounds
 - 4) Decrease the mid point of the compound
4. **Red coloured complex ion formed on adding FeCl₃ to sodium extract when N and S both are present in organic compounds**
 - 1) $[Fe(CN)_6]^{-4}$
 - 2) $[Fe(CNS)_3]$
 - 3) $[Fe(CNS)_2]^+$
 - 4) $Fe_4[Fe(CN)_6]_3$
5. **A hydrocarbon on heating with cupric oxide gives CO₂ and a compound 'A'. The compound 'A' gives on a reaction with anhydrous CuSO₄ gives colour**
 - 1) White
 - 2) Blue
 - 3) Green
 - 4) Orange
6. **In Kjeldahl's method, the nitrogen of the organic compound is converted into during digestion**
 - 1) NH₄Cl
 - 2) (NH₄)₂SO₄
 - 3) NH₃
 - 4) N₂ gas
7. **Turpentine oil is purified by**
 - 1) Steam distillation
 - 2) Fractional distillation
 - 3) Azeotropic distillation
 - 4) Chemical method
8. **Which of the following can be used as adsorbent in adsorption chromatography?**
 - 1) Silica gel
 - 2) Alumina
 - 3) Cellulose
 - 4) All of these
9. **The sodium extract of an organic compound on acidification with acetic acid followed by addition of lead acetate solution gives a black precipitate. This confirms the solution gives a black precipitate. This confirms the presence of in the organic compound**
 - 1) N
 - 2) P
 - 3) S
 - 4) Cl
10. **In Dumas' method, the gas collected in Schiff's nitro meter is**
 - 1) N₂
 - 2) NO
 - 3) NH₃
 - 4) H₂
11. **Chromatography is used for the separation of**
 - 1) Sugars
 - 2) Plant Pigments
 - 3) Amino acids
 - 4) All of these
12. **A mixture contains four solid organic compounds A, B, C and D. On heating only 'C' changes from the solid to the vapour state. The compound 'C' can be separated from the rest by**
 - 1) Distillation
 - 2) Sublimation
 - 3) Fractional distillation
 - 4) Crystallisation
13. **How will you separate a mixture of two miscible liquids benzene and chloroform?**
 - 1) Sublimation
 - 2) Filtration
 - 3) Fractional distillation
 - 4) Crystallisation
14. **In paper chromatography,**
 - 1) Moving phase is liquid and stationary phase is solid
 - 2) Moving phase is liquid and stationary phase is liquid
 - 3) Moving phase is solid and stationary phase is solid
 - 4) Moving phase is solid and stationary phase is liquid

15. The best and latest technique for isolation, purification and separation of organic compound is
 1) Crystallisation 2) Distillation 3) Sublimation 4) Chromatography
16. Separation of two substances by fractional crystallization is based upon their difference in
 1) Density 2) Solubility 3) Boiling point 4) Crystalline nature
17. Nitrogen present in an organic compound is estimated as in Duma's method and as in kjeldahl's method.
 1) NH_3 , N_2 respectively 2) N_2 , NH_3 respectively
 3) $(\text{NH}_4)_2\text{SO}_4$, NH_4Cl respectively 4) N_2 , NCl_3 respectively
18. During the test of halogens by silver nitrate test, the sodium extract is first boiled with a few drops of HNO_3 to
 1) decompose sodium halides present 2) help in the precipitation of AgCl
 3) increase the concentration of NO_3^- ions 4) decompose Na_2S and NaCN if formed
19. 0.59g of an organic compound was kjeldahlised. The ammonia evolved was passed in 50cm^3 of 1 N H_2SO_4 . The residual acid needed 60cm^3 of N/2 NaOH solution. The percentage of the nitrogen in this compound is
 1) 14 2) 28 3) 42 4) 56
20. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gives C, 38.71% and H, 9.67%. The empirical formula of the compound is:
 1) CH_4O 2) CH_2O 3) CH_3O 4) CHO
21. 0.2 g of an organic compound on complete combustion gives 0.18 g of water. The percentage of hydrogen in it is:
 1) 10 2) 20 3) 30 4) 15
22. If 0.2 g of an organic compound containing carbon, hydrogen and oxygen on combustion yielded 0.147 g of CO_2 and 0.12 g of H_2O . What will be the content of oxygen in the substance?
 1) 73.29% 2) 78.45% 3) 83.23% 4) 89.50%
23. Four hypothetical binary mixtures are given below with their boiling points. Which of them can be separated by simple distillation?
 A) A(b.p. 78°C) + B(b.p. 85°C) B) A(b.p. 78°C) + B(b.p. 90°C)
 C) A(b.p. 78°C) + C(b.p. 20°C) D) A(b.p. 78°C) + D(b.p. 130°C)
 1) A and B only 2) C only 3) C and D only 4) A, B and D only
24. **List – I** **List – II**
 (Compound) (Formula)
- | | |
|--|---|
| I) Prussian blue | i) $\text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}]$ |
| II) Ferric thiocyanate | ii) $\text{Na}_4[\text{Fe}(\text{CN})_5\text{NOS}]$ |
| III) Sodium nitroprusside | iii) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$ |
| IV) Violet colour compound formula in the test for sulphur | iv) $[\text{Fe}(\text{CNS})_3]$ |
-
- | | I | II | III | IV |
|----|-----|----|-----|-----|
| 1) | iii | iv | I | ii |
| 2) | iii | iv | ii | i |
| 3) | iii | I | ii | iv |
| 4) | I | iv | ii | iii |

25. 0.157 g of an organic compound in sulphur estimation gave 0.4813 g of barium sulphate. The percentage of sulphur in the compound is
 1) 17.29% 2) 21.05% 3) 42.28% 4) 42.1%
26. In a compound of C, H and N atoms are present in 9 : 1 : 3 : 5 by weights. If molecular weight of the compound is 108, then molecular formula of compound is
 1) $C_2H_6N_2$ 2) C_3H_4N 3) $C_6H_8N_2$ 4) $C_9H_{12}N_2$
27. The ammonia evolved from the treatment of 0.30 g of an organic compound for estimation of nitrogen was passed in 100 mL of 0.1 M sulphuric acid. The excess of acid required 20 ml of 0.5 M sodium hydroxide solution for complete neutralization. The organic compound is
 1) Urea 2) Benzamide 3) Acetamide 4) Thiourea
28. An organic compound having molecular mass 60 is found to contain C = 20%, H=6.67% and N = 46.67% while rest is oxygen. On heating it gives NH_3 along with a solid residue. The solid residue gives violet colour with alkaline copper sulphate solution. The compound is
 1) $CH_3CH_2CONH_2$ 2) CH_3CONH_2 3) $(NH_2)_2CO$ 4) CH_3NCO
29. 29.5 mg of an organic compound containing nitrogen was digested according to kjeldhal's method and the evolved ammonia was absorbed in 20 ml of 0.1 M HCl solution. The excess of the acid required 15 ml of 0.1 M NaOH solution for complete neutralization. The percentage of nitrogen in the compound is
 1) 47.4 2) 23.7 3) 29.5 4) 59.0
30. A mixture of camphor and benzoic acid can be separated by:
 1) sublimation 2) extraction with a solvent
 3) chemical method 4) fractional crystallisation

KEY

- 1) 1 2) 1 3) 3 4) 2 5) 2 6) 2 7) 1 8) 4 9) 3 10) 1
 11) 4 12) 2 13) 3 14) 2 15) 4 16) 2 17) 2 18) 4 19) 4 20) 3
 21) 1 22) 1 23) 3 24) 1 25) 4 26) 3 27) 1 28) 2 29) 2 30) 3

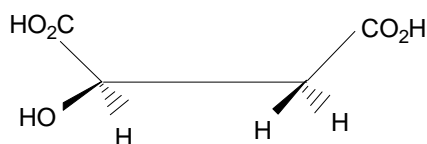
4. SUB TOPIC NAME: ISOMERISM

1. Compounds having same number and kind of atoms but different arrangement of atoms in their molecules are called
 1) Isotopes 2) polymers 3) isomers 4) allotropes
2. Keto-enol tautomerism is not observed in
 1) $C_6H_5COC_6H_5$ 2) $C_6H_5COCH=CH_2$
 3) $C_6H_5COCH_2COCH_3$ 4) $CH_3COCH_2COCH_3$
3. C_7H_8O shows how many isomers?
 1) 2 2) 3 3) 4 4) 5

4. Which one of the following will show optical isomerism?
 1) $\text{CH}_2\text{OH} - \text{COOH}$ 2) $(\text{CH}_3)_2\text{CH} - \text{COOH}$
 3) $\text{CH}_3\text{CH}(\text{OH})\text{COOH}$ 4) $(\text{CH}_3)_2\text{C}(\text{Cl})\text{COOH}$
5. Number of a cyclic isomers represented by molecular formula $\text{C}_4\text{H}_{10}\text{O}$ is
 1) 4 2) 5 3) 6 4) 7
6. The isomerism that arises due to restricted bond rotation is
 1) Position isomerism 2) metamerism
 3) geometrical isomerism 4) functional isomerism
7. Identify the compound that exhibits tautomerism
 1) 2-butene 2) Lactic acid 3) Phenol 4) 2-pentanone
8. cis-2-butene and trans-2-butene are
 1) Optical isomers 2) Conformational isomers
 3) Structural isomers 4) Configurational isomers
9. Geometrical isomerism is not exhibited by
 1) 2-Butene 2) Propene
 3) 3-methyl pent-2-ene 4) 2-methyl but-2-ene
10. The number of Stereoisomers possible for a compound of the molecular formula $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$ is
 1) 2 2) 3 3) 4 4) 6
11. The number of optical isomers of $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CHO}$ is
 1) 2 2) 3 3) 4 4) 6
12. A similarity between optical and geometrical isomerism is that
 1) each forms equal number of isomers for a given compound
 2) if in a compound one is present then so is the other
 3) both are included in stereo isomerism
 4) they have no similarity
13. Which one of the following will have a mesoisomer also?
 1) 2-chloro butane 2) 2, 3-dichloro butane
 3) 2, 3-dichloro pentane 4) 2-Hydropropanoic acid
14. Number of structural isomers for C_6H_{14} is
 1) 3 2) 4 3) 5 4) 6
15. The two structures written below represent
- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{HO} - \text{C} - \text{H} \\ | \\ \text{H} - \text{C} - \text{OH} \\ | \\ \text{CH}_2\text{OH} \end{array}$$

$$\begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{HO} - \text{C} - \text{H} \\ | \\ \text{H} - \text{C} - \text{OH} \\ | \\ \text{CH}_3 \end{array}$$
- 1) Pair of diastereomers 2) Pair of enantiomers
 3) same molecule 4) both are optically inactive

16. The absolute configuration of



- 1) S, R 2) S, S 3) R, R 4) R, S

17. Which of the following cannot exist in 'syn' and 'anti' forms?

- 1) $C_6H_5-N=N-OH$ 2) $C_6H_5-N=N-C_6H_5$
3) $C_6H_5-CH=N-OH$ 4) $(C_6H_5)_2C=N-OH$

18. Match the following

List – I

- 1) Pair of chain isomers
2) A pair of position isomers
3) A pair of functional isomers
4) A pair of tautomers

List – II

- A) $CH_3COCH_2COO C_2H_5$; $CH_3C(OH) = CHCOO C_2H_5$
B) $CH_3CH_2 CH_2CHO$; $CH_3COCH_2CH_3$
C) $CH_3CH_2 C \equiv CH$; $CH_3C \equiv CCH_3$
D) $CH_3CH_2 CH_2CH_3$; $CH_3-CH(CH_3)-CH_3$

- 1) 1-A, 2-B, 3-C, 4-D 2) 1-D, 2-C, 3-B, 4-A
3) 1-B, 2-D, 3-A, 4-C 4) 1-C, 2-A, 3-D, 4-B

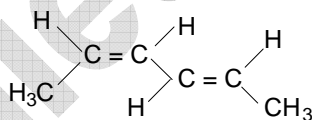
19. Which of the following is correctly matched?

Compound	Number of geometrical isomers
1) $CH_3 - CH = CH - CH = CH - C_2H_5$	4
2) $CH_3 - (CH = CH)_4 - CH_3$	2
3) $H_2C = CH - CH = CH_2$	10
4) $CH_3 (-CH = CH)_5 - CH_3$	5

20. Increasing order of stability among the three main conformations (i.e., eclipse, anti, gauche) of 2-fluoro ethanol is

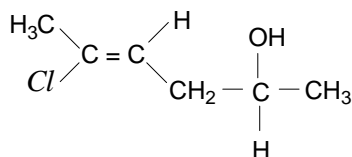
- 1) eclipse, gauche, anti 2) gauche, eclipse, anti
3) eclipse, anti, gauche 4) anti, gauche, eclipse

21. The correct name of the following structure is



- 1) (E), (E) – 2, 4-hexadiene 2) (Z), (Z)-3, 5-hexadiene
3) (E), (Z)-3, 5-hexadiene 4) (Z), (E) – 2, 4, hexadiene

22. The compound whose stereo chemical formula is written below exhibits 'x' geometrical isomers and 'y' optical isomers



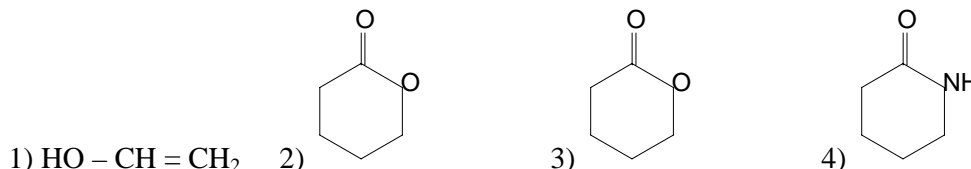
The values of 'x' and 'y' are

- 1) 4 and 4 2) 2 and 2 3) 2 and 4 4) 4 and 2

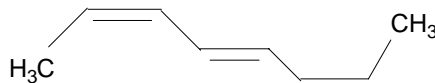
23. Which of the following cycloalkanes involves maximum torsional strain?

- 1) Cyclopropane 2) Cyclobutane 3) Cyclopentane 4) Cyclohexane

24. **Dihedral angle in staggered and eclipsed conformations are**
 1) 60° and 0° 2) 0° and 60° 3) 60° , 120° 4) 120° , 60°
25. **The energy barrier between eclipsed and staggered forms is**
 1) 6.7 kJ/mol 2) 12.55 kJ/mol 3) 29.7 kJ/mol 4) 44 kJ/mol
26. **Which of the following compounds cannot show tautomerism ?**



27. **The IUPAC name of the compounds**



- 1) (2E, 4E, 6Z)-octa-2, 4, 6-triene 2) (2E, 4E, 6E)-octa-2, 4, 6-triene
 3) (2Z, 4E, 6Z)-octa-2, 4, 6-triene 4) (2Z, 4Z, 6Z)-octa-2, 4, 6-triene

KEY

- 1) 3 2) 1 3) 4 4) 3 5) 4 6) 3 7) 4 8) 4 9) 4 10) 3
 11) 3 12) 3 13) 2 14) 3 15) 3 16) 3 17) 4 18) 2 19) 1 20) 3
 21) 4 22) 2 23) 1 24) 1 25) 2 26) 3 27) 3

5. SUB TOPIC NAME: MECHANISM OF ORGANIC REACTIONS

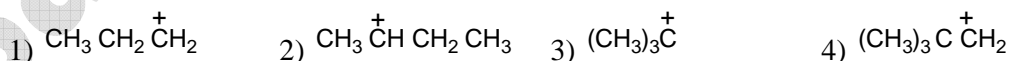
1. **Polarization of electrons in acrolein may be written as**



2. **The stablest free radical among the following is**



3. **Which of the following ions is most stable?**



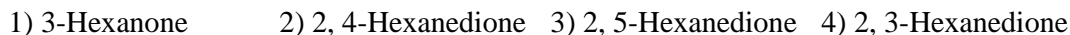
4. **The strongest acid amongst the following compound is**

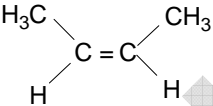
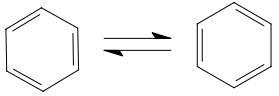


5. **Which of the following has the highest nucleophilicity?**



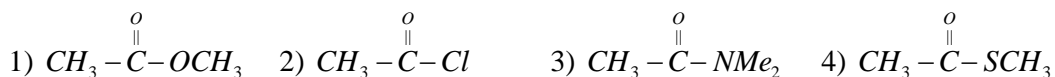
6. **Which of the following has the most acidic hydrogen?**



7. Due to the presence of an unpaired electron, free radicals are
 1) Chemically reactive 2) Chemically inactive
 3) Anions 4) Cations
8. The correct stability order of the following resonance structures is
 I) $H_2C = \overset{+}{N} = \bar{N}$ II) $H_2 \overset{+}{C} - N = \bar{N}$ III) $H_2 \bar{C} - \overset{+}{N} \equiv N$ IV) $H_2 \bar{C} - N = \overset{+}{N}$
 1) I > II > IV > III 2) I > III > II > IV 3) II > I > III > IV 4) III > I > IV > II
9. Which one of the following carbanions is the least stable ?
 1) $(CH_3)_3 \bar{C}$ 2) CH_3^- 3) $HC \equiv \bar{C}$ 4) $CH_3CH_2^-$
10. Which of the following intermediates have the complete octet around the carbon atom?
 1) Carbonium ion 2) Carbanion 3) Free radical 4) Carbene
11. Hyperconjugation involves overlap of the following orbitals
 1) $\sigma - \sigma$ 2) $\sigma - p$ 3) $p - p$ 4) $\pi - \pi$
12. The basicity of aniline is less than that of cyclohexylamine. This is due to
 1) -R effect of $-NH_2$ group 2) -I effect of $-NH_2$ group
 3) +R effect of $-NH_2$ group 4) hyperconjugation effect
13. The increasing order of stability of the following free radicals is
 1) $(CH_3)_2 \dot{C}H < (CH_3)_3 \dot{C} < (C_6H_5)_2 \dot{C}H < (C_6H_5)_3 \dot{C}$
 2) $(C_6H_5)_3 \dot{C} < (C_6H_5)_2 \dot{C}H < (CH_3)_3 \dot{C} < (CH_3)_2 \dot{C}H$
 3) $(C_6H_5)_2 \dot{C}H < (C_6H_5)_3 \dot{C} < (CH_3)_3 \dot{C} < (CH_3)_2 \dot{C}H$
 4) $(CH_3)_2 \dot{C}H < (CH_3)_3 \dot{C} < (C_6H_5)_3 \dot{C} < (C_6H_5)_2 \dot{C}H$
14. Which of the following hydrocarbons has the lowest dipole moment

 1) $CH_3C \equiv C - CH_3$ 2) $CH_3C \equiv C - CH_3$
 3) $CH_3CH_2C \equiv CH$ 4) $H_2C = CH - C \equiv CH$
15. The arrangement of $(CH_3)_3C-$, $(CH_3)_2CH-$, CH_3CH_2- when attached a benzene or an unsaturated group in increasing order of inductive effect is
 1) $(CH_3)_3C- < (CH_3)_2CH- < CH_3CH_2-$ 2) $CH_3CH_2- < (CH_3)_2CH- < (CH_3)_3C-$
 3) $(CH_3)_2CH- < (CH_3)_3C- < CH_3CH_2-$ 4) $(CH_3)_3C- < CH_3CH_2- < (CH_3)_2CH-$
16. Which of the following statements regarding the resonance energy of benzene is correct ?
 1) The energy required to break the C-H bond in benzene
 2) The energy required to break the C-C bond in benzene
 3) The energy is a measure of stability of benzene

 4) The energy required to convert
17. Hyperconjugation is most useful for stabilizing which of the following carbocations?
 1) tert-Butyl 2) neo-pentyl 3) iso-propyl 4) Ethyl

18. Which is the decreasing order of acidity in, HCOOH (I), CH_3COOH (II), $\text{CH}_3\text{CH}_2\text{COOH}$ (III) and $\text{C}_6\text{H}_5\text{COOH}$ (IV) ?
 1) $\text{I} > \text{II} > \text{III} > \text{IV}$ 2) $\text{IV} > \text{III} > \text{II} > \text{I}$ 3) $\text{IV} > \text{I} > \text{II} > \text{III}$ 4) $\text{I} > \text{IV} > \text{II} > \text{III}$
19. In the following compounds phenol (I), P-cresol (II), m-nitrophenol (III) and P-nitrophenol (IV), the order of acidity is
 1) $\text{III} > \text{IV} > \text{I} > \text{II}$ 2) $\text{I} > \text{IV} > \text{III} > \text{II}$ 3) $\text{II} > \text{I} > \text{III} > \text{IV}$ 4) $\text{IV} > \text{III} > \text{I} > \text{II}$
20. Inductive effect involves
 1) displacement of σ - electrons 2) delocalization of π - electrons
 3) delocalization of σ - electrons 4) displacement of π - electrons
21. In the following compounds, anisole (I), benzene (II) and nitrobenzene (III), the case of reaction with electrophiles is
 1) $\text{II} > \text{III} > \text{I}$ 2) $\text{III} > \text{II} > \text{I}$ 3) $\text{II} > \text{I} > \text{III}$ 4) $\text{I} > \text{II} > \text{III}$
22. Hyper conjugation phenomenon is possible in
 1) $\text{H}_2\text{C} = \text{CH}_2$ 2) $\text{CH}_3\text{CH}_2 - \text{CH} = \text{CH}_2$
 3) $\text{C}_6\text{H}_5\text{CH} = \text{CH}_2$ 4) $(\text{CH}_3)_3\text{C} - \text{CH} = \text{CH}_2$
23. Which of the following contains three pairs of electron?
 1) Carbocation 2) Carbanion 3) Free radical 4) Zwitter ion
24. Which of the following is an electrophilic reagent?
 1) H_2O 2) OH^- 3) NO_2^+ 4) CN^-
25. The following reaction is an example of
-
- 1) Nucleophilic substitution 2) Electrophilic substitution
 3) Electrophilic addition 4) Nucleophilic addition
26. The following reaction is $\text{C}_2\text{H}_5\text{Br} + \text{KOH} \rightarrow \text{C}_2\text{H}_5\text{OH} + \text{KBr}$
 1) electrophilic substitution 2) elimination
 3) nucleophilic substitution 4) addition
27. The following reaction is $\text{H}_2\text{C} = \text{CH}_2 + \text{Br}_2 \rightarrow \text{H}_2\text{C}(\text{Br}) - \text{CH}_2(\text{Br})$
 1) Electrophilic addition 2) Electrophilic substitution
 3) nucleophilic addition 4) nucleophilic substitution
28. Elimination reaction occurs with the formation of
 1) one sigma bond 2) one pi bond
 3) one sigma and one pi bond 4) two sigma and one pi bond
29. Heterolytic fission of a covalent bond can form
 1) free radical 2) both carbocation and carbanion
 3) only carbocation 4) only carbanion
30. The kind of delocalization involving sigma bond orbitals is
 1) Hybridization 2) conformation 3) hyperconjugation 4) resolution

31. Least active electrophile is



32. Stability of alkyl carbocations can be explained by

- A) Inductive effect B) Resonance C) Hyper conjugations D) Electromeric effect
1) A and B 2) A and D 3) C and D 4) A and C

33. Which of the following is correct regarding the -I effect of the substituents ?

- 1) $-\text{NR}_2 < -\text{OR} < -\text{F}$ 2) $-\text{NR}_2 > -\text{OR} < -\text{F}$ 3) $-\text{NR}_2 < -\text{OR} > -\text{F}$ 4) $-\text{NR}_2 > -\text{OR} > -\text{F}$

34. Which statement is correct for inductive effect?

- 1) It is a permanent effect
2) It is the property of single bond
3) It causes permanent polarization in the molecule
4) All are correct

35. Which statement is correct for electromeric effect?

- 1) It is a temporary effect
2) It is the property of π -bond
3) It takes place in the presence of attacking reagent
4) All are correct

36. Which one of the following series contains electrophiles only?

- 1) H_2O , SO_3 , H_3O^+ 2) NH_3 , H_2O , AlCl_3 3) AlCl_3 , SO_3 , N^+O_2 4) H_2O , Cl^+ , NH_3

37. Which of these species is/are electrophiles

- 1) CCl_2 2) AlCl_3 3) SO_3 4) All of these

38. The formation of cyanohydrins from a ketone is an example of

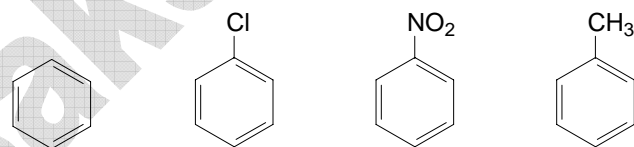
- 1) Electrophilic addition 2) Nucleophilic addition
3) Nucleophilic substitution 4) Electrophilic substitution

39. The stability of the compounds



- 1) $1 > 3 > 2 > 4$ 2) $4 > 3 > 1 > 2$ 3) $4 > 1 > 3 > 2$ 4) $2 > 3 > 4 > 1$

40. Write the following in decreasing order towards electrophilic substitution reaction



- 1) $\text{I} > \text{II} > \text{III} > \text{IV}$ 2) $\text{IV} > \text{I} > \text{II} > \text{III}$ 3) $\text{II} > \text{III} > \text{IV} > \text{I}$ 4) $\text{II} > \text{I} > \text{IV} > \text{III}$

KEY

- 1) 1 2) 4 3) 3 4) 3 5) 3 6) 2 7) 1 8) 2 9) 1 10) 2
11) 2 12) 2 13) 1 14) 2 15) 1 16) 3 17) 1 18) 4 19) 4 20) 1
21) 4 22) 2 23) 1 24) 3 25) 4 26) 3 27) 1 28) 2 29) 2 30) 3
31) 3 32) 4 33) 1 34) 4 35) 4 36) 3 37) 4 38) 2 39) 2 40) 2