CHEMHACK

Organic (XI + XII)

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CHEMHACK's Doubt Discussion

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PARTH GOYAL

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A LETTER FROM THE AUTHOR

Hi,

First of all, take a deep breath, relax, and realise it, you really have a CHEM "HACK" in you hands right now! You are soon going to outperform in chemistry in every aspects that you can ever imagine!

I am a MBBS Student & NEET Ranker, AIR 223 in NEET 2019, and I made this book during my 2nd Year MBBS. I have guided thousands of NEET aspirants and this book is the result of all their love and affection towards me. Making this book was a dream for me, and now it is a reality!

So how do I got this idea of "CHEMHACK" ? Let me tell you the whole story -

It all was accidently discovered by me, I was horrible at learning theoretical subjects which involves "rattafication". They used to be the hardest subject for me, as my memory was not good and I used to forget things faster. One day my teacher said me to make Assertion/Reason questions from NCERT for preparation for AIIMS entrance. I initially found this idea boring and time consuming. But one day I thought, why not to make other kind of questions which are easier to make and less time consuming. I tried the idea, and it came out to be the best thing I ever did for myself!

I did this for biology and my marks improved a lot. Then I thought , why not to try the same method in other theoretical subjects like organic chem ? After starting doing this, my chemistry marks also increased I got so much time left that I cleared JEE also, with NEET! [illegible] 99.45%ile in JEE Mains & AIR 5364 in JEE Adv!

Later I came to know that I was using a modern scientifically proven study technique, i.e. active recall. You can learn about it from some of the videos of my Youtube channel named "Parth Goyal". :)

Using CHEMHACK, you can revise even big chapters of chemistry (that too quality revision) in just 15-20 min without leaving a single imp point. Yes it saves that much amount of time! Thousands of students have used my this techniques and got selection, you will find many on my Instagram stories, @parth_vegan.

Using this, you will cover whole NCERT and will also not have to waste time reading useless big paragraphs of NCERT. I have invested almost 6-8 hrs in each and every chapter of chemhack, making it the best possible revision material available, covering each and every single important point of NCERT. With these chemhacks, you will be able to increase your marks in NEET, JEE & school exams to such a great extent that you can't even imagine!

But my plans for you don't end here! After you will get selected in MBBS or IIT/NIT, do ping me once on my Instagram or Facebook. I have a vision of doing something revolutionary in the field of healthcare, and will need your help in it! Together, we will doing some really big things and make our nation proud! The plan will be disclosed to you after your selection! :)

With lot's of love & happy wishes
- Parth Goyal

FEATURES OF THE CHEMHACK BOOK

1) All Imp. points of NCERT Covered – All the important facts and diagrams of NCERT are covered. Only theory not important from an exam point of view is omitted.

2) Mnemonics : Funny mnemonics and short tricks added wherever needed

3) DigaQs : These questions will make your diagram practice super-duper! Chemhack contains all important molecular structures.

4) Essence of Chemhack (Active Recall) : Instead of reading NCERT theory again and again for revision (which is a boring process to be true), asking questions from it is better because it will make you more focused and make the revision process fun and faster!

5) PYQs highlighted by mentioning (NEET) beside them

6) Internal linking in PDF so that you can easily switch between answers and questions just by clicking on the coloured "ANSWERS" & "QUESTIONS" button. Also in Index you can visit any chapter just by clicking on its name.

7) Short questions so that revision can be fast – small reduction in no of words in each question successively will save a lot of time and will cause bullet-train superfast revision!

How to Use ?

You can use this book for **revision (that too in an active recall manner, that's why they are best!)** & also after reading NCERT for **question practice.**

Contents

CHEMHACK

Organic (XI + XII)

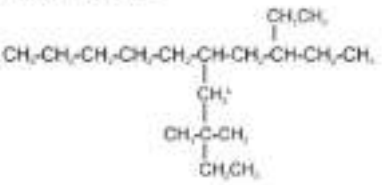
Chapter 1
GENERAL ORGANIC CHEMISTRY

INTRODUCTION & IUPAC

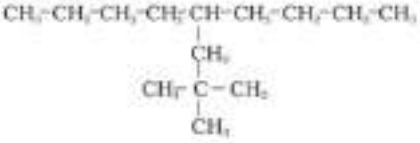
1. _____ proposed a 'vital force' was responsible for the formation of organic compounds.
2. The greater the S character, the lesser is the electronegativity. T/F
3. Name a non-benzenoid compound -
4. Name a heterocyclic compound -
5. Name heterocyclic aromatic compounds - (3)
6. Anisole formula -
7. Aniline formula -
8. Acetophenone formula -
9. Toluene formula -
10. Isopropyl structure -
11. sec-Butyl- structure -
12. Isobutyl- structure - (NEET)
13. tert-Butyl- structure -

14. neopentyl structure -
15. IUPAC name of -

16. IUPAC name of -



17. IUPAC name of -



18. The priority order of function groups is -
19. IUPAC name of Br-CH2-CH=CH2 is -
20. Tell the prefix and suffix used for each functional groups -
21. Draw structure of 4-Ethyl-1-fluoro-2-nitrobenzene
22. Draw structure of 2,3 - Dibromo -1 - phenylpentane

ANSWERS 1

ANSWERS 2

ISOMERISM & FUNDAMENTAL CONCEPTS OF REACTION MECHANISM

23. Types of structural isomerism are - (4)
24. Types of stereoisomerism are - (2)
25. Ketone show functional isomerism with -
26. Give an ex. of metamerism -
27. Permanent electron displacement effects are - (3)
28. Temporary electron displacement effects are - (1)
29. Carbocations are sp2/sp3 hybridised
30. Carbanions are paramagnetic. T/F
31. +I effect order -
32. -I effect order -
33. The resonance structures (canonical structures or contributing structures) are hypothetical and individually do not represent any real molecule. T/F
34. Bond length in benzene is -
35. The energy of the resonance hybrid is lower than that of any of the canonical structures. T/F
36. The resonating structures must have the same no. of unpaired electrons. T/F
37. Among resonating structures, which kind of them are more stable ?
38. Resonance effect is also called -
39. Halogens show +R/-R effect
40. +R effect is shown by -
41. -R effect is shown by -
42. When inductive and electromeric effects operate in opposite directions, _____ effect predominates.
43. Lone pair of N in pyridine is involved in resonance. T/F
44. Criteria for aromaticity are -
45. Criteria for anti-aromaticity are -
46. Carbene exist as 2 states, namely - (2)
47. Triplet carbene have a ___ no. of unpaired electrons

METHODS OF PURIFICATION OF ORGANIC COMPOUNDS

48. Paper chromatography is an example of - (NEET)
49. The most suitable method of separation of 1:1 mixture of ortho and para nitrophenols is - (NEET)
50. The best method for the separation of naphthalene and benzoic acid from their mixture is - (NEET)
51. The types of distillation are - (4)
52. Chloroform & aniline are easily separated by -

53. Crude oil in petroleum industry is seperated by -

54. Glycerol is separated from spent-lye in the soap industry from using _____ technique

55. Aniline is seperated from aniline-water mixture by -

56. The 2 types of chromatography is -

57. Commonly used adsorbents in adsorption chromatography are - (2)

58. The 2 main types of adsorption chromatography is -

59. Thin layer chromatography plate is also called -

60. Rf value is called -

61. Amino acid can be detected in layer chromatography by spraying plate with _____ solution

62. Chromatography paper contains _____ trapped in it, which acts as the stationary/mobile phase

QUALITATIVE ANALYSIS OF ORGANIC COMPOUNDS

63. How are C and H detected?

64. Formation of CO2 and H2O due to the reaction of C and H with CuO is tested by -

65. Detection of N,S,P & halogen in an organic compound is done by _____ test. (NEET)

66. N, S, P and halogens are first fused with _____

67. Test for N -

68. Rxns that take place to test the presence of N are - (2) (NEET)

69. Formation of _____ colour confirms the presence of N. It appears due to formation of - (NEET)

70. Test for S - (2)

71. In test 1, _____ colour indicates and in test 2, _____ colour indicates the presence of S

72. Rxns in both the tests are -

73. When N & S both are present, _____ is formed after fusion with Na

74. After rxn of sodium fusion extract with Fe3+, blood-red colour is formed. What does it indicate?

75. If Na fusion is carried out with an excess of Na, the thiocyanate decomposes to _____ and _____ which give their usual tests.

76. Test for X(halogens) -

77. Formation of a yellow precipitate, insoluble in NH4OH indicate the presence of -

78. Tell what kinds of precipitate indicate the presence of Cl, Br, I

79. If N & S is present in the compound, the Na fusion extract is first boiled with conc. HNO3 before doing the test for halogens. This is to - (NEET)

80. Test for P -

81. _____ colour precipitate indicates the presence of P.

82. Rxns that occur in P test are - (2)

ANSWERS 2 ANSWERS 3

QUANTITATIVE ANALYSIS

83. C & H in are estimated by reacting the organic compound with -

84. 2 methods for estimation of N are - (NEET)

85. Rxn of Dumas method -

86. 0.3g of an organic compound gives 50mL of N2 collected at 300K temp. & 715mm pressure. Calculate the % of N in the compound. (Aqueous tension at 300K=15 mm)

87. Rxns of Kjeldahl method - (3)

88. Kjeldahl method calculation formula

89. Kjeldahl method is most commonly applied to check purity in pyridine mixture. T/F

90. Kjeldahl method is not applicable to - (3)

91. During the estimation of N, the NH3 evolved from 0.5 g of the compound in Kjeldahl's estimation of nitrogen, neutralized 10 mL of 1 M H2SO4. Find the % of N in the compound.

92. Carius method is used for estimation of -

93. 40 g of an organic compound gave 18.8 g of AgBr. Find out the % of bromine in the compound.

94. Rxn in S estimation is -

95. Steps of P estimation are -

96. 320 g of an organic compound gave 466 g of $BaSO_4$ in sulfur estimation. What is the % of S in the compound?

97. Rxns in O estimation -

98. Presently organic compounds are determined by an apparatus known as -

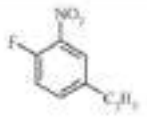
ANSWERS

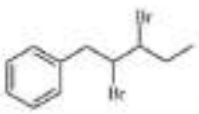
• INTRODUCTION & IUPAC

1. Benzelon
2. F
3. Tropane
4. Tetrahydrofuran
5. Furan, Thiophene, Pyridine
6. $C_6H_5OCH_3$
7. $C_6H_5NH_3$
8. $C_6H_5COCH_3$
9. C_6H_5OH
10. $CH_3CH(CH_3)-$
11. $CH_3CH_2CH(CH_3)-$
12. $CH_3CH(CH_3)CH_2-$
13. $CH_3C(CH_3)(CH_3)-$
14. $CH_3C(CH_3)(CH_3)CH_2-$
15. 3-Ethyl-1-dimethyl cyclohexane
16. 5-(2-Ethylbutyl)-3,3-dimethyldecane
17. 5-(2,2-Dimethylpropyl) nonane
18. -COOH, $-SO_3H$, -COOR, COCl, $-CONH_2$, -CN, -HC=O, >C=O, -OH, $-NH_2$, >C=C<, $-C\equiv C-$
19. 3-bromoprop-1-ene

20. Table given below

Class of compounds	Functional group structure	IUPAC group prefix	IUPAC group suffix
Alkanes	-	-	-ane
Alkenes	>C=C<	-	-ene
Alkynes	-C≡C-	-	-yne
Arenes	-	-	-
Halides	-X (X=F,Cl,Br,I)	halo-	-
Alcohols	-OH	hydroxy-	-ol
Aldehydes	-CHO	formyl, or oxo	-al
Ketones	>C=O	oxo-	-one
Nitriles	-CN	cyano	-nitrile
Ethers	-R-O-R	alkoxy-	-
Carboxylic acids	-COOH	carboxy	-oic acid
Carboxylate ions	$-COO^-$	-	-oate
Esters	-COOR	alkoxycarbonyl	-oate
Acyl halides	-COX (X=F,Cl,Br,I)	halocarbonyl	-oyl halide
Amines	$-NH_2$, >NH, >N-	amino-	-amine
Amides	$-CONH_2$, -CONHR, $-CONR_2$	-carbamoyl	-amide
Nitro compounds	$-NO_2$	nitro-	-
Sulphonic acids	$-SO_3H$	sulpho	sulphonic acid

21 

22 

• ISOMERISM & FUNDAMENTAL CONCEPTS OF REACTION MECHANISM

23. Chain isomers, Position isomers, Functional group isomers, Metamerism
24. Geometrical isomerism, optical isomerism
25. Aldehyde
26. methoxypropane ($CH_3OC_3H_7$) and ethoxyethane ($C_2H_5OC_2H_5$)
27. Inductive effect, mesomeric effect, hyperconjugation effect
28. Electromeric effect
29. Sp^2
30. T
31. $-CH_2- > -NH- > -O- > -COO- >$ tertiary alkyl > secondary alkyl > primary alkyl > $-CH_3 > -H$
32. $-NF_3 > -NH_3 > -NO_2 > -SO_3H > -CN > -CHO >$ ketone > $-COOH > -COOR > -CONH_2 >$ $-F > -Cl > -Br > -I > -OH > -OR > -C \equiv CH > -C_6H_5 > -CH = CH_2 > -H$
33. T
34. 139 pm
35. T
36. T
37. one which has more number of covalent bonds, all the atoms with octet of electrons (except H), less separation of opposite charges, (a -ve charge if any on more electronegative atom, a +ve charge if any on more electropositive atom) and more dispersal of charge
38. Mesomeric effect
39. +R
40. +R effect – halogen, –OH, –OR, –OCOR, –NH_2, –NHR, –NR_2, –NHCOR,
41. –R effect – –COOH, –CHO, >C=O, – CN, –NO_2
42. Electromeric effect
43. F
44. i) Planarity
ii) Conjugation
iii) Cyclic
iv) Presence of $(4n + 2)\pi$ electrons in the ring
45. i) Planarity
ii) Conjugation
iii) Cyclic
iv) Presence of $(4n)\pi$ electrons in the ring
46. Singlet, triplet
47. 2

• METHODS OF PURIFICATION OF ORGANIC COMPOUNDS

48. Partition Chromatography
49. Steam distillation
50. Sublimation
51. Simple distillation, fractional distillation, distillation under reduced pressure, steam distillation
52. Simple distillation
53. Fractional distillation
54. Distillation under reduced pressure
55. Steam distillation
56. Adsorption and partition chromatography
57. Silica gel and alumina

58. Column chromatography and thin layer chromatography
59. Chromoplate
60. Retardation factor
61. Ninhydrin solution
62. Water: stationary phase

• QUALITATIVE ANALYSIS OF ORGANIC COMPOUNDS

63. Compound is heated with CuO
C + CuO → Cu + CO2
H + CuO → Cu + H2O
64. CO2 + Ca(OH)2 → CaCO3 + H2O (turbidity is seen)
H2O + CuSO4 → CuSO4.5H2O (solution turns blue)
65. Lassaigne's test
66. Na metal
67. Na fusion extract is boiled with FeSO4 and then acidified with conc. H2SO4
68. I. 6CN− + Fe2+ → [Fe(CN)6]4−
II. 3[Fe(CN)6]4− + 4Fe3+ → Fe4[Fe(CN)6]3.xH2O
69. Prussian Blue, Fe4[Fe(CN)6]3.xH2O
70. I. Na fusion extract is acidified with acetic acid and lead acetate is added
II. Na fusion extract treated with sodium nitroprusside
71. black, violet
72. I. S2− + Pb2+ → PbS
2. S2− + [Fe(CN)5NO]2− → [Fe(CN)5NOS]4−
73. NaSCN (Sodium thiocyanate)
74. Presence of both N & S in compound
75. Cyanide and sulphide
76. Na fusion extract is acidified with HNO3 and then treated with AgNO3
77. Iodine
78. White precipitate, soluble in NH4OH - Cl
Yellowish precipitate, sparingly soluble in NH4OH - Br
Yellow precipitate, insoluble in NH4OH - I
79. decomposed cyanide or sulphide of Na formed in Lassaigne test
80. Compounds are heated with an oxidising agent (sodium peroxide). The P present in the compound is oxidised to (PO4)3-. The solution is boiled with HNO3 & then treated with (NH4)2MoO4.
81. Yellow
82. I. Na3PO4 + 3HNO3 → H3PO4+3NaNO3
II. H3PO4 + 12(NH4) 2MoO4 + 21HNO3 → (NH4)3PO4.12MoO3 + 21NH4NO3

• QUANTITATIVE ANALYSIS

83. O2 and CuO
84. Dumas & Kjeldahl's method
85. CxHyNz + (2x + y/2) CuO → x CO2 + y/2 H2O + z/2 N2 + (2x + y/2) Cu
86. 17.46 %
87. I. Organic compound + H2SO4 → (NH4)2SO4
II. (NH4)2SO4 + NaOH → Na2SO4 + NH3 + H2O
III. 2NH3 + H2SO4 → (NH4) 2SO4
88. Percentage of N = 14 x M x 20V- V1/2V/m
89. F
90. Nitro, azo and nitrogen present in the ring
91. 56 %
92. Halogen
93. 20 %
94. I. S oxidised to H2SO4
II. H2SO4 + BaCl2 → BaSO4 + HCl
95. I. P is oxidised to (PO4)3-
II. PO4 2- is precipitated as (NH4) 3 PO4.12MoO3 or Mg2P2O7
96. 20 %

97. I. Compound → O_2 + other gaseous products
II. $2C + O_2 \rightarrow 2CO$

IV. $I_2O_5 + 5CO \rightarrow I_2 + 5CO_2$
98. CHN elemental analyser

Chapter 2

HYDROCARBONS

ALKANES

GENERAL & PREPARATION

1. Number of chain isomers of C_7H_{16} are -
2. General formula for alkane is -
3. $CH_3-CH=CH_2 + H_2 \rightarrow CH_3-CH_2-CH_3$ in presence of -
4. $CH_3-Cl + H_2$ (Zn, H+) $\rightarrow$
5. $CH_3-F + H_2$ (Zn, H+) $\rightarrow CH_4 + HF$. This reaction is spontaneous. T/F
6. Wurtz reaction cannot give good yields of compounds with odd number of carbon atoms. T/F (NEET)
7. $C_2H_5Br + Na$/dry ether $\rightarrow$
8. What is soda lime ?
9. $CH_3CH_2COO-Na+$ on heating with soda lime give -
10. $CH_3CH_2COO-Na+$ on kolbe's electrolysis give - (NEET)
11. Name the 3 substrates that can be used to produce alkanes.

PHYSICAL PROPERTIES

12. First three alkanes are gases, the rest are solid or liquid. T/F (NEET)
13. C_5 to $C_{\_}$ are liquids.
14. With increase in molecular mass, boiling point increases/decreases.
15. The boiling point increase with increase molar mass because -
16. With increase in branching in the molecule, boiling point increases/decreases.
17. Among 2-Methylbutane & 2,2-Dimethylpropane, boiling point of _____ is high.

CHEMICAL PROPERTIES

18. Respective rate of halogens when they react with alkane is in the order -
19. Iodination of alkane is a fast/slow process.
20. $3^\circ H$ is more readily replaced than $1^\circ H$ in halogenation. T/F
21. $CH_4 + O_2$ (Cu/573K/100atm) $\rightarrow$
22. $CH_3OH + O_2$ ($(CH_3COO)_2Mn + \Delta$) $\rightarrow$
23. $CH_4 + O_2$ ($Mo_2O_3 + \Delta$) $\rightarrow$
24. $(CH_3)_3CH$ ($KMnO_4$) $\rightarrow$
25. Alkanes are isomerised in the presence of -

26. n-hexane in presence of what gives benzene ?
27. Toluene can be made by aromatisation of which alkane ?
28. $CH_4 + H_2O$ (N, Δ) →
29. What is pyrolysis ?
30. Preparation of oil gas or petrol gas from kerosene oil or petrol involves the principle of _____ (NEET)
31. Pyrolysis is also called

CONFORMATIONS

32. Alkanes have an infinite number of conformations. T/F
33. Staggered is less stable compared to eclipsed. T/F (NEET)
34. Any conformation other than staggered and eclipsed is called -
35. Dihedral angle in staggered form of ethane is - (NEET)
36. It is possible to separate and isolate different conformational isomers of ethane. T/F

ALKENES

GENERAL

37. General formula -
38. Ethylene formula -
39. Formula of methene -
40. IUPAC name of - (i) $(CH_3)_2CH-CH=CH-CH_2-CH(CH_2-CH-CH_3)(C_2H_5)$ (ii) $CH_3CH_2CH_2CH_2-CH(CH_3)-CH=C(CH_2CH_3)-CH_2-CH(CH_3)_2$
41. No. of sigma bonds in 1,3,5,7 - Octatetraene is -
42. $CH_2=CH-CH_2-CH_3$ & $CH_3-C(=CH_2)-CH_3$ are examples of chain/position isomers
43. How many isomers of C_4H_8 are possible ?
44. Trans form isomer is more polar than cis form isomer. T/F
45. Trans isomer have higher melting point than cis isomer. T/F

PREPARATION

46. Alkene are be prepared from - (4)
47. Alkynes on partial reduction with calculated amount of H_2 in the presence of _____ give alkenes. (NEET)
48. What is Lindlar's catalyst ?
49. Palladised charcoal is partially deactivated by poisons like - (2) (NEET)
50. Alkene obtained used Lindlar's catalyst are cis/trans. (NEET)

51. Alkyne on reduction with _____ form trans alkene (NEET)
52. Alkyl halide give alkene by -
53. Dehydrohalogenation is an example of α-elimination/β-elimination reaction
54. I leave more readily than Cl in dehydrohalogenation. T/F
55. Primary alkyl halide more easily forms alkene than tertiary halide during dehydrohalogenation. T/F
56. Vicinal dihalides give alkene on treatment with -
57. Alcohols give alkene on heating with -

PROPERTIES

58. The first three/four alkenes are gas.
59. Next fourteen/fifteen are liquid
60. Like alkanes, straight chain alkenes have higher boiling point than isomeric branched chain compounds. T/F
61. Iodine do not show addition reactions under normal conditions. T/F
62. _____ colour of Br2 solution in CCl_4 is decolourised when Br2 reacts with alkene.
63. The above reaction is used as a test for unsaturation. T/F
64. Addition of halogens(X) is an ex. of electrophilic/nucleophilic addition reaction
65. X addition proceeds through the formation of _____ ion
66. Order of reactivity of hydrogen halides(HX) with alkene is
67. HX addition is an ex. of electrophilic/nucleophilic addition reaction
68. Propene in the presence of benzoyl peroxide on reaction with HCl give major product as -
69. Anti-Markovnikov addition is also called - (2)
70. Anti-Markovnikov occur in the presence of _____ and also only with the hydrogen halide -
71. Anti-Markovnikov proceeds through _____ mechanism. (NEET)
72. Why does HCl and HI don't add through Anti-Markovnikov ?
73. Hot/Cold conc. H_2SO_4 add to alkene in accordance to Markovnikov/anti-Markovnikov rule to form R-HSO_4
74. Alkene form alcohol by the addition of -
75. What is Baeyer's reagent ?
76. Alkene on reaction with Baeyer's reagent form -
77. Baeyer's reagent is also used to test unsaturation. T/F
78. _____ & _____ oxidises alkene to ketones or acids. (NEET)
79. _____ reaction is highly useful in determining the position of double bond in alkene.
80. Ozonolysis involves reagents - (3)
81. Alkene on first reaction with O_3 form _____ which is then cleaved by Zn-H_2O to smaller molecules
82. Draw propene ozonide.
83. 2-Methylpropene on ozonolysis give -

ANSWERS 1 ANSWERS 2

84. Ozonolysis products can only be ketone or aldehyde but never carboxylic acids. T/F (NEET)
85. Polymerisation requirements - (3)
86. _____ is used for the manufacture of milk crates and plastic buckets

ALKYNES

GENERAL & PREPARATION

87. General formula -
88. Acetylene formula -
89. Acetylene is used for arc welding purposes in the form of _____ flame obtained by mixing acetylene with _____
90. Dimethylacetylene structure -
91. No. of isomers of C_5H_8 -
92. No. of isomers of C_6H_{10} -
93. Alkynes are prepared from - (2)
94. CaC_2 when treated with _____ give ethyne
95. Vicinal dihalides on treatment with _____ give alkene which on treatment with _____ give alkyne

PROPERTIES

96. First _____ members are gases, next _____ members are liquids and rest are solids.
97. Ethyne is acidic in nature. T/F
98. Ethyne is acidic because -
99. $CH_3\text{-}C\equiv C\text{-}H + NaNH_2 \rightarrow$ (NEET)
100. Which is more acidic, ethyne or propyne ?
101. Propyne + $Br_2 \rightarrow$
102. Reddish orange colour of Br_2 is decolourised in case of alkyne also. T/F
103. Alkyne + $HX \rightarrow$
104. What are gem dihalides ?
105. Propyne + $HBr \rightarrow$
106. Alkyne reacts with H_2O on warming with _____ and _____ at _____ K to form carbonyl compounds
107. Alkyne on addition with water form di-alcohols. T/F
108. Alkyne on reaction with water form -
109. Linear polymerisation of ethyne cause formation of -
110. Polyacetylene contains repeated units of -
111. Polyacetylene can conduct electricity. T/F

02. Polyacetylene is used as - (1)

03. Cyclic polymerisation of propyne form -

04. Cyclic polymerisation occurs when substrate is passed through _____ at ____ K. (NEET)

AROMATIC HYDROCARBONS

GENERAL & PREPARATION

05. Biphenyl is aromatic/non-aromatic.

06. Benzene is a planar/non-planar molecule. T/F

07. Criteria for aromaticity are - (3) (NEET)

08. Benzene is commercially isolated form _____

09. _____ on heating with sodalime gives benzene.

10. Phenol is reduced to benzene by passing its vapours over _____

PROPERTIES

11. Reagents used for nitration are -

12. Reactive species in nitration of benzene is - (NEET)

13. Reagents used for halogenation - (NEET)

14. Electrophile in case of chlorination of benzene in presence of FeCl3 is - (NEET)

15. For sulphonation, benzene is heated with _____ also called _____

16. Reagents for alkylation - (NEET)

17. Reagents for acylation -

18. Benzene + Acetic anhydride (in presence of Anhyd AlCl3, Δ)→

19. Benzene in presence of excess Cl2 & Anhyd AlCl3 (dark cold) give -

20. Under high T & P in presence of Ni catalyst, hydrogenation of _____ give cyclohexane.

21. Under uv light, Benzene + Cl2 →

22. Gammexane formula -

23. Further substitution on monosubstituted benzenes depends on the nature of the entering group. T/F

24. Halogens are an activating/deactivating and ortho-para/meta directing group.

25. -NHCOCH3 is an activating/deactivating and ortho-para/meta directing.

26. -SO3H is an activating/deactivating and ortho-para/meta directing.

27. Ex. of ortho and para directing groups are - (8) (NEET)

28. Ex. of meta directing groups are - (7) (NEET)

29. Benzene is carcinogenic. T/F

ANSWERS 2 ANSWERS 3

ANSWERS

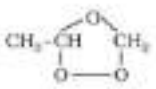
• ALKANES

1. 9
2. C_nH_{2n+2}
3. Pt/Pd/Ni
4. $CH_4 + HCl$
5. F, this reaction doesn't occur, i.e. it is non spontaneous
6. T
7. C_2H_5-C_2H_5 (n-butane)
8. Mixture of NaOH and CaO
9. C_2H_6
10. C_2H_6
11. Substrates that can be used to produce alkanes
I. Unsaturated hydrocarbons
II. Alkyl halides
III. Carboxylic acids
12. F, first 4 are gases
13. IT
14. Increase
15. intermolecular van der Waals forces increase with increase of the molecular size or the surface area of the molecule
16. Decrease
17. 2-Methyl butane
18. $F_2 > Cl_2 > Br_2 > I_2$
19. Slow
20. T
21. CH_3OH
22. CH_3COOH
23. $HCHO + H_2O$
24. $(CH_3)_3COH$
25. Anhydrous $AlCl_3/HCl$
26. Cr_2O_3 or V_2O_5 or Mo_2O_3
27. C_7H_{16}
28. $CO + 3H_2$
29. Higher alkanes on heating to higher temperature decompose into lower alkanes
30. Pyrolysis
31. Cracking
32. T
33. F
34. Skew
35. 60°
36. F

• ALKENES

37. C_nH_{2n}
38. C_2H_4
39. CH_2
40. IUPAC names
(i) 2,8-Dimethyl-3, 6-decadiene
(ii) 4-Ethyl-2,6-dimethyl-dec-4-ene
41. IT
42. Chain isomers
43. 6 [2 chain, 2 cyclic & 2 geometrical(cis-trans)]
44. F
45. T
46. Alkyne, alkyl halides, vicinal dihalides, alcohols
47. Lindlar's catalyst
48. Partially deactivated palladised charcoal
49. Sulphur compounds, quinoline
50. C_6
51. Na/liquid NH_3
52. Heating with alc. KOH
53. β-elimination

54. T, (Leaving order - I > Br > Cl)
55. F, (Tert > secondary > primary)
56. Zinc metal
57. Conc. H_2SO_4
58. Three
59. Fourteen
60. T
61. T
62. Reddish orange
63. T
64. Electrophilic
65. Cyclo halonium
66. HI > HBr > HCl
67. Electrophilic
68. 2-Chloropropane
69. Peroxide effect or Kharash effect
70. Peroxide, HBr
71. Free radical mechanism
72. H–Cl bond is stronger than H–Br bond and is not cleaved by the free radical, H–I bond is weaker and iodine free radicals combine to form iodine molecules instead of adding to the double bond
73. Cold, Markownikov
74. Water
75. Cold, dilute, aqueous solution of $KMnO_4$
76. Vicinal glycols
77. T
78. Acidic $KMnO_4$, acidic $K_2Cr_2O_7$
79. Ozonolysis
80. O_3, Zn–H_2O
81. Ozonide
82. Propene ozonide



83. HCHO, Propanone-2-one
84. F
85. High Temp. High P, Catalyst
86. Polypropene

• ALKYNES

87. C_nH_{2n-2}
88. C_2H_2
89. Oxyacetylene, O_2
90. CH_3-C≡C-CH_3
91. 3
92. 7
93. CaC_2, vicinal dihalides
94. H_2O
95. Alc. KOH, $NaNH_2$(Sodamide)
96. 3, 8
97. T
98. High s character in C-H bond which leads to high electronegativity of C
99. Sodium propynide (CH_3-C≡C-Na^+)
100. Ethyne
101. 1,1,2,2-Tetrabromopropane
102. T
103. Gem dihalides
104. in which two halogens are attached to the same carbon atom
105. 2,2-Dibromopropane
106. $HgSO_4$ and dil. H_2SO_4, 333K
107. F
108. H form aldehyde or ketone
109. Polyethyne or polyacetylene
110. (CH = CH –CH = CH)
111. T
112. Electrodes in batteries
113. 1,3,5-trimethylbenzene
114. Red hot iron tube at 873K

• AROMATIC HYDROCARBONS

05. Aromatic

06. Planar

07. Criteria for aromaticity

(i) Planarity

(ii) Complete delocalisation of the π e- in the ring

(iii) Presence of (4n + 2) π electrons in the ring where n is an integer (n = 0, 1, 2, ...)

08. Coal tar

09. Sodium salt of benzoic acid

10. Zn

11. Conc. HNO3 + Conc. H2SO4

12. NO_2^+

13. X2 and any lewis acid like Anhyd. AlCl3, FeCl3, FeBr3

14. O_3

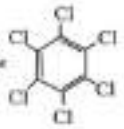
15. H2S2O7 (fuming sulphuric acid), oleum

16. R-Cl, Anhyd. AlCl3

17. Acyl halide, AlCl3

18. 

Acetophenone

19. Hexachlorobenzene 

20. Benzene

21. Gammaxane

22. C6H6Cl6 (Benzene hexachloride) 

23. F, it depends on nature of the substituent already on benzene

24. Deactivating, ortho-para

25. Activating, ortho-para

26. Deactivating, meta

27. –NH2, –NHR, –NHCOCH3, –OCH3, –CH3, –C2H5, –OH, –X

28. –NO2, –CN, –CHO, –COR, –COOH, –COOR, –SO3H

29. T

Chapter 3

ENVIRONMENTAL CHEMISTRY

ATMOSPHERIC POLLUTION

1. Humans require nearly __-__ times more air than the food
2. _____ extend upto height of about 10 km from sea level.
3. Stratosphere is found between ___ to ___ km above sea level.
4. Troposphere/stratosphere is a turbulent, dusty zone.
5. _____ is the region of strong air movement and cloud formation.

TROPOSPHERIC POLLUTION

6. The 2 major types of air pollutants are -
7. Ex. of gaseous air pollutants are - (6)
8. Ex. of particulate air pollutants are - (5)

OXIDES OF SULPHUR, NITROGEN, CARBON & ACID RAIN

9. SO_2 is poisonous to both plants and animals. T/F
10. SO_2 cause respiratory diseases namely - (3)
11. Sulphur dioxide causes irritation to the eyes, resulting in tears and redness. T/F
12. High conc. of _____ leads to stiffness of flower buds. (NEET)
13. Presence of _____ in polluted air catalyses the oxidation of SO_2 to SO_3.
14. The irritant red haze in the traffic and congested places is due to -
15. Higher concentrations of NO_2 in plants cause - (2)
16. NO_2 is a _____ irritant.
17. Nitrogen dioxide is also harmful to various textile fibres and metals. T/F
18. Hydrocarbons are carcinogenic. T/F
19. Hydrocarbons do not harm plants. T/F
20. _____ is one of the most serious air pollutants.
21. Haemoglobin with CO form carboxyhaemoglobin/carbaminohaemoglobin. (NEET)
22. Carboxyhaemoglobin is _____ times more stable than oxyhaemoglobin/carbaminohaemoglobin.
23. In pregnant women, excessive smoking may induce _____ _____ _____ due to increased levels of CO.
24. CO_2 is found in the stratosphere also. T/F
25. CO_2 normally forms ____% by volume of the atmosphere.
26. GHG examples - (6) (NEET)

27. Normally rain water have a pH of ____ (NEET)
28. _____ can be seen as atmospheric haze
29. _____ or _____ result in wet-deposition
30. ____is also absorbed directly on both solid and liquid ground surfaces and is thus deposited as dry-deposition

PARTICULATE POLLUTANTS

31. Particulates are divided into categories - (2)
32. Visible particulates ex - (4)
33. Non-visible particulates ex - (4)
34. Smoke particulate consist of _____ or mixture of _____ and _____
35. Fly ash from factories is a dust/smoke
36. Dust is composed of fine solid/liquid particles with diameter over ____
37. Pollutants produced by condensation of vapour are - (2)
38. Which compounds form fume particles - (3)
39. Lead interferes with the development and maturation of -
40. The 2 types of smog is - (2)
41. Classical smog is oxidising/reducing smog
42. Classical smog is a mixture of ____ (3)

43. Photochemical smog is oxidising/reducing smog (NEET)
44. Photochemical smog primary precursors are - (2) (NEET)
45. Components (secondary precursors) of photochemical smog are - (5) (NEET)
46. Full form of PAN -
47. The unburnt hydrocarbon reacts with ____ and ____ to form photochemical smog
48. _____ and _____ act as powerful eye irritants. (NEET)
49. _____ and _____ irritate nose and throat. (NEET)
50. Photochemical smog leads to cracking of rubber and extensive damage to plant life. T/F
51. _____ are used in automobiles, which prevent release of NO and hydrocarbons
52. Plants that can metabolise NO are - (5)

STRATOSPHERIC POLLUTION

53. _____ are also known as freons. (NEET)
54. Atmospheric scientists working in Antarctica reported about depletion of ozone layer over the North/South Pole
55. In summer, _____ and _____ react with ____ and _____ forming chlorine sinks
56. Chlorine sinks accelerate/prevent ozone depletion

57. In winter, special types of clouds called _____ are formed over Antarctica
58. Rains that take place in summer are - (2)
59. Rains that take place in winter are - (2)
60. Rains that take place in spring - (2)
61. UV radiations cause damage to fish productivity. T/F
62. UV radiation can decrease water content in soil. T/F

WATER POLLUTION

63. Ex. of point source water pollutant - (2)
64. Non-point source ex - (3)
65. Human excreta contains bacteria such as - (2)
66. In cold water, DO can reach a conc. up to ____ ppm. (NEET)
67. If the conc. of DO of water is below __ ppm, the growth of fish gets inhibited. (NEET)
68. BOD indirectly measures the amount of _____ in water.
69. Clean water BOD is less than ____ ppm, whereas highly polluted water could have a BOD value of ____ ppm or more. (NEET)
70. Ex. of heavy metals - (3)
71. Raw salt used to melt snow and ice in the colder climates are water soluble chemical pollutants. T/F
72. Ex. of raw salt used to melt snow are - (2)
73. Organic chemical pollutants ex - (5)
74. PCB full form -
75. PCBs are suspected to be carcinogenic. T/F
76. Biodegradable detergents are not problematic to the environment. T/F
77. In eutrophication, plants/animals are killed.
78. Fluoride deficiency in drinking water can cause - (1)
79. Fluoride conc. in drinking water should be upto __ ppm. (NEET)
80. The F^- ion makes the enamel harder by converting _____ to _____
81. F^- ion conc. above 2 ppm cause - (NEET)
82. Excess fluoride (over 10 ppm) cause - (NEET)
83. Prescribed upper limit conc. of Pb in drinking water is ____ ppb/ppm.
84. Lead can damage the reproductive system. T/F
85. More than _____ ppm sulphate in drinking water can cause laxative effect.
86. Nitrate maximum limit in drinking water is ____ ppm.
87. Excess nitrate in drinking water cause -
88. Prescribed conc. of Fe, Mn, Al, Cu, Zn and Cd in drinking is -

SOIL POLLUTION

89. Name some pesticides - (3)
90. What is biomagnification ?
91. Less persistent and more bio-degradable pesticides ex - (2)
92. Organo-phosphates and carbamates are severe nerve toxins. T/F
93. Ex. of some herbicides - (2)
94. Some herbicides cause birth defects. T/F
95. Studies show that corn fields sprayed with herbicides are more prone to insect attack and plant disease than fields that are weeded manually. T/F

INDUSTRIAL WASTE, POLLUTION CONTROL & GREEN CHEMISTRY

96. Nowadays _____ and _____ from the steel industry are utilized by cement industry
97. 2 divisions of Swachh Bharat Abhiyan were -
98. $CCl_2=CCl_2$ is a suspected carcinogen. T/F
99. _____ with a suitable _____ is used instead of $CCl_2=CCl_2$ for dry cleaning
100. $CH_2 = CH_2 + O_2$ in presence of $PdCl_2/CuCl_2$ (in water) give →
101. In green chemistry _____ is used instead for Cl_2 gas for bleaching
102. Powder of _____ of _____ has been found to be even more effective than alum for clearing water.

ANSWERS

• ATMOSPHERIC POLLUTION

1. 12-15
2. Troposphere
3. 10-50 km
4. Troposphere
5. Troposphere

• TROPOSPHERIC POLLUTION

6. Gaseous and Particulate
7. Oxides of S, N & C, H2S, hydrocarbons, ozone
8. dust, mist, fumes, smoke, smog

• OXIDES OF SULPHUR, NITROGEN, CARBON & ACID RAIN

9. T
10. Asthma, bronchitis, emphysema
11. T
12. SO2
13. Particulate matter
14. Oxides of nitrogen
15. Damage to leaves and retard the rate of photosynthesis
16. Lung
17. T
18. T
19. F
20. CO
21. Carboxyhaemoglobin
22. 300, oxyhaemoglobin
23. Premature births, spontaneous abortions and deformed babies
24. F, it is confined to troposphere only
25. 0.03 %
26. CO2, CH4, O3, CFC, water vapour, N2O
27. 5.6
28. Ammonium salts
29. Aerosol particles of oxides or ammonium salts
30. SO2

• PARTICULATE POLLUTANTS

31. Viable and non-viable
32. Bacteria, fungi, moulds, algae
33. Smoke, dust, mists, fumes
34. Solid, solid and liquid
35. Dust
36. Solid, 1µm
37. Mists and fumes
38. Organic solvents, metals and metallic oxides
39. RBC
40. Classical and Photochemical smog
41. Reducing
42. Smoke, fog and SO2
43. Oxidising
44. Unsaturated hydrocarbons and nitrogen oxides
45. O3, NO, acrolein, formaldehyde and PAN
46. peroxyacetyl nitrate
47. O3 & NO2
48. O3 and PAN
49. O3 and NO
50. T
51. Catalytic converters
52. Pinus, Juniperus, Quercus, Pyrus and Vitis

• STRATOSPHERIC POLLUTION

53. CFC
54. South Pole
55. NO2 and CH4, CO and Cl
56. Prevent
57. Polar stratospheric clouds

58.
(i) $CO^{\bullet}(g) + NO2\ (g) \rightarrow ClONO2(g)$
(ii) $Cl^{\bullet}(g) + CH4\ (g) \rightarrow CH3^{\bullet}(g) + HCl(g)$
59.
(i) $ClONO2(g) + H2O\ (g) \rightarrow HOCl\ (g) + HNO3\ (g)$
(ii) $ClONO2(g) + HCl\ (g) \rightarrow Cl2\ (g) + HNO3\ (g)$
60.
(i) $HOCl\ (g) \rightarrow OH^{\bullet}(g) + Cl^{\bullet}(g)$
(ii) $Cl2\ (g) \rightarrow 2\ Cl^{\bullet}(g)$
61. T
62. T

• WATER POLLUTION

63. Municipal and industrial discharge pipes
64. Agricultural runoff, acid rain, storm-water discharge
65. Escherichia coli and Streptococcus faecalis
66. 10
67. 6
68. Organic matter
69. 5,7
70. Cadmium, mercury, nickel
71. T
72. Sodium and calcium chloride
73. Major oil spills, pesticides, PCBs, detergents, fertilizers
74. polychlorinated biphenyls
75. T
76. F
77. Animals
78. Tooth decay
79. Ippm
80. Hydroxyapatite to fluorapatite
81. Brown mottling of teeth
82. Harmful effects to bones and teeth
83. 50 ppb
84. T
85. >500 ppm
86. 50 ppm
87. Blue baby syndrome
88.

Metal	Maximum concentration (ppm or mg dm^{-3})
Fe	0.2
Mn	0.05
Al	0.2
Cu	3.0
Zn	5.0
Cd	0.005

• SOIL POLLUTION

89. DDT, aldrin and dieldrin
90. The pollutant gets 10 times conc. At each trophic level
91. Organo-phosphates and carbamates
92. T
93. sodium chlorate ($NaClO3$), sodium arsenite ($Na3AsO3$)
94. T
95. T

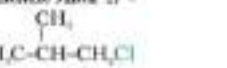
• INDUSTRIAL WASTE, POLLUTION CONTROL, GREEN CHEMISTRY

96. Fly ash and slag
97. Swachh Bharat Mission Urban (SBM-U) & Swachh Bharat Mission Gramin (SBM-G)
98. T
99. Liquefied CO2 with a suitable detergent
100. $CH3CH2OH$ (ethanol)
101. $H2O2$
102. Kernel of tamarind seeds

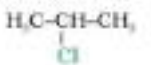
Chapter 4
HALOALKANES & HALOARENES

GENERAL

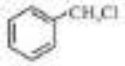
1. Cl containing antibiotic ex - (1)
2. _____ is used for the treatment of malaria
3. _____ is used as an anaesthetic drug during surgery
4. Allylic carbon means -
5. Vinylic carbon means -
6. 1° Benzylic halide structure -
7. Simplest vinylic bromide is -
8. Simplest Allylic chloride is -
9. Common name of -



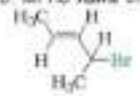
10. Common name of -



11. Draw sym-Tribromobenzene
12. What are alkylidenes ?
13. What are geminal dihalides ?
14. What are vicinal dihalides ?
15. In common name system, gem-dihalides are named as alkylene dihalides and vic-dihalides as alkylidene halides. T/F
16. CH_3-$CHCl_2$ common name is -
17. Methylene chloride formula -
18. Bromoform formula -
19. IUPAC name and common name of -



20. IUPAC name of -



21. Arrange all the CH3-X in order of their dipole moments.
22. Why does CH3Cl have more dipole moment than CH3F ?

PREPARATION METHODS

23. The -OH of alcohol can be replaced by -X on reaction with - (3)

24. _____ is however preferred as a reagent to replace -OH because the other two are escapable gases

25. R-OH + HCl → R-Cl + H2O. This reaction needs ZnCl2 as a catalyst for which type of alcohols?

26. R-OH + NaBr + H2SO4 →

27. In the above reaction, in situ preparation of _____ is occurring which is the molecule that is actually reacting with R-OH.

28. R-OH + PX3 → R-X + H3PO3. This is valid for X =

29. R-OH + PCl5 → (NEET)

30. PBr3 and PI3 are usually generated in situ by the reaction of _____ with Br2 and I2 respectively

31. R-OH + SOCl2 →

32. Good yields of R—I may be obtained by heating alcohols with NaI or KI in a solution of a weak acid like __X solution of _____ acid

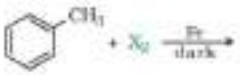
33. Weak acid is used in case of R—I formation because -

34. The order of reactivity of 1°, 2°, 3° alcohols with a given haloacid is -

35. White fumes are generated when alcohol reacts with _____. These white fumes are of _____

36. Constant boiling with alcohols with (HBr 48%) is used for preparing -

37

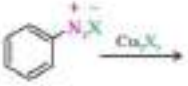


38. Ortho and para isomers haloarenes have large differences in their melting points.T/F

39. Reactions with I2 require the presence of an oxidising agent to oxidize _____ formed during the reaction.

40

41



42. Aryl halides that are prepared by the above reaction are -

43. Iodobenzene is prepared by simply shaking diazonium salt with -

44. _____ on reaction with Br2/CCl4 gives vic-dibromides

45. Write Finkelstein reaction -

46. _____ is used in Finkelstein reaction to precipitate NaCl or NaBr formed and facilitate forward reaction

47. Write Swarts reaction -

48. Reagents that can be used in Swarts reaction are - (s) (NEET)

49. Why is NaF not used in Swarts reaction ? (NEET)

ANSWERS 1 ANSWERS 2

50. Why is H_2SO_4 not used during the reaction of alcohols with KI ?

51. Draw the structures of major monohalo products in each of the following reactions

(i)

(ii)

PHYSICAL PROPERTIES

52. C_2H_5Cl is gaseous at room temp. T/F

53. B.p. of chlorides, bromides and iodides are considerably lower than those of the hydrocarbons of comparable molecular mass. T/F

54. The boiling points of RCl, RI , RF and RBr where R is alkyl group is in the order -

55. B.p order of ortho, meta, para di-halobenzenes are -

56. M.p. order of ortho, meta, para di-halobenzenes are -

57. Why para have more M.p. than ortho ?

58. Why ortho have more B.p than para ?

59. As haloalkane are polar, they are readily soluble in water. T/F

CHEMICAL REACTIONS

REACTIONS OF HALOALKANES

60. KCN + R-X → A. The class of product is - (NEET)

61. AgCN + R-X → A. The class of product is -

62. KNO2 + R-X → A. The class of product is -

63. AgNO2 + R-X → A. The class of product is -

64. Why do AgNO2 form nitroalkane and KNO2 form alkyl nitrite?

65. In S_N2, the rate depends upon -

66. Inversion of configuration doesn't occur in S_N2. T/F

67. Order of reactivity of 1°,2°,3° halide in S_N2 is -

68. S_N1 reactions are carried out on non-polar/polar aprotic/protic solvents

69. In S_N1, the formation of the carbocation is the slowest/fastest and reversible/irreversible step.

70. Energy for breaking the C-X bond in S_N1 is obtained from -

71. Greater the stability of carbocation, the faster will be the reaction. T/F

72. Order of reactivity of 1°,2°,3° halide in SnI is -

73. R-Cl, R-I, R-Br, R-F reactivity order for SnI and Sn2 respectively are -

74. In SnI, stereochemically _____ occurs. (NEET)

75. Compounds that rotate plane polarized light to left are called -

76. The stereoisomers related to each other as non-superimposable mirror images are called - (NEET)

77. Enantiomers possess identical physical properties. T/F

78. The sign of optical rotation is not necessarily related to the absolute configuration of the molecule. T/F

79. 1° alkyl prefer Sn2/SnI/elimination

80. 2° alkyl prefer - (2)

81. 3° alkyl prefer - (2)

82. Grignard reagents are obtained by - (NEET)

83. Why is dry ether used in Grignard reagent?

84. Write Wurtz reaction - (NEET)

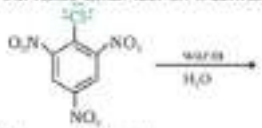
REACTIONS OF HALOARENES

85. 4 reasons why are aryl halides extremely less reactive towards nucleophilic substitution reactions are -

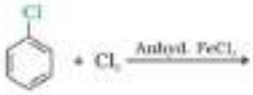
86.

87. The presence of an electron withdrawing group at which positions will increase reactivity of haloarene towards nucleophilic substitution ? (NEET)

88. Aryl halide which out on treatment with warm H2O give alcohol is -



89. Major product in the rxn -



90. Minor product of rxn -

91. Reactivity towards electrophilic substitution is more in chlorobenzene in comparison to benzene. T/F (NEET)

92. Inductive effect by halogen is stronger than the resonance effect in case of haloarenes. T/F

93. Write Wurtz-Fittig reaction -

94. Write Fitting reaction -

ANSWERS 2 ANSWERS 3

POLYHALOGEN COMPOUNDS

95. Major use of chloroform today is in the production of -

96. Phosgene formula and common name - (NEET)

97. $CHCl_3 + O_2$ (in presence of light) $\rightarrow$

98. Most common freon is -

99. Freon 12 formula -

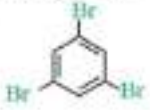
100. Freon 12 is manufactured using _____ reaction

101. DDT full form and structure -

ANSWERS

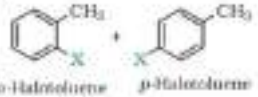
• GENERAL

1. Chloramphenicol
2. Chloroquine
3. Halothane
4. sp3 -hybridised carbon atom next to carbon-carbon double bond
5. sp2-hybridised carbon atom of a carbon-carbon double bond
6. 

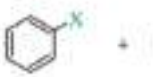
7. Bromoethene
8. 3-Chloropropene
9. Isobutyl chloride
10. Isopropyl chloride
11. 

12. dihaloalkanes having the same type of halogen atoms
13. halogen atoms are present on the same carbon atom
14. halogen atoms are present on the adjacent carbon atoms
15. F
16. Ethylidene chloride
17. CH_2Cl_2
18. $CHBr_3$
19. IUPAC - Chlorophenylmethane, Common name - Benzyl chloride
20. 4-Bromopent-2-ene
21. $CH_3Cl > CH_3F > CH_3Br > CH_3I$
22. D = q x d as C-Cl bond length is way larger than C-F, it compensate for the less charge separation between C-Cl comparing to C-F

• PREPARATION METHODS

23. conc. halogen acids, phosphorus halides or thionyl chloride
24. Thionyl chloride ($SOCl_2$)
25. 1° & 2° alcohols
26. R-Br + $NaHSO_4$ + H_2O
27. HBr
28. ClBr
29. R-Cl + $POCl_3$ + HCl
30. Red P
31. R-Cl + SO_2 + HCl
32. HI, H_3PO_4
33. Strong acid will oxidise I- to I2
34. 3°>2°>1°
35. $SOCl_2$, HCl
36. R-OH
37. 

o-Halotoluene p-Halotoluene
38. I
39. H
40. 

41. 

42. Chlorobenzene, Bromobenzene
43. KI

44. Alkane

45. $R\text{-}X + NaI \rightarrow R\text{-}I + NaX$

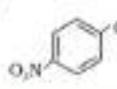
46. Dry acetone

47. $CH_3\text{-}Br + AgF \rightarrow CH_3\text{-}F + AgBr$

48. AgF, Hg_2F_2, CoF_2 or SbF_3

49. Swarts reaction occur in water. NaF if used would result in explosion but in AgF and others three have covalent character so F is not purely ionised to F^-.

50. H_2SO_4 cannot be used along with KI in the conversion of an alcohol to an alkyl iodide as it converts KI to corresponding acid i.e. HI which is then oxidised by it to I_2

51. (i) 

(ii) 

• PHYSICAL PROPERTIES

52. T

53. F

54. RI > RBr > RCl > RF

55. Ortho > Para > Meta

56. Para > Ortho > Meta

57. M.p. is seen through symmetry as symmetry causes effective packing. Para is more symmetric than ortho

58. B.p. is seen through dipole moment. Ortho have more dipole moment than para

59. F

• REACTIONS OF HALOALKANES

60. R-CN, Nitrile

61. R-NC, isonitrile

62. R-O-N=O, alkyl nitrite

63. R-NO_2, nitroalkane

64. KNO_2 is ionic compound so it give NO_2^- ion. As O- is present in NO_2^-, it readily attack the R and form R-O-N=O. Whereas in $AgNO_2$, O is covalently bonded with Ag and hence lone pairs of N attack R and form R-NO_2

65. conc. of both the reactants

66. F

67. $1^\circ > 2^\circ > 3^\circ$

68. Polar, protic

69. Slowest, reversible

70. Solvation of halide ion with the proton of protic solvent

71. T

72. $3^\circ > 2^\circ > 1^\circ$

73. Same of both, i.e. - R–I> R–Br>R–Cl>R–F

74. Racemisation

75. Laevorotatory

76. Enantiomers

77. T

78. T

79. Sn2

80. Sn2 or elimination

81. Sn1 or elimination

82. Reaction of haloalkane with Mg in dry ether

83. Because grignard reagent react very rapidly with acidic -H, even water, so it needs dry isolated environment

84. $RX + Na \rightarrow RR + NaX$ (in dry ether)

85. (i) Resonance effect - C-Cl bond acquire partial double bond character

(ii) X attached to sp^2 hybridised carbon

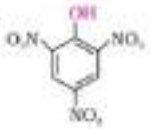
(iii) Instability of phenyl cation

(iv) possible repulsion between e- rich nucleophile to approach e- rich arenes

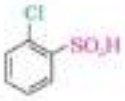
86. 

• REACTIONS OF HALOARENES

87. Ortho and para

88. 

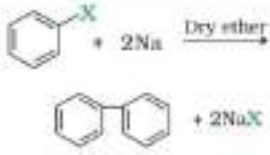
89. 

90. 

91. F

92. T

93. 

94. 

• POLYHALOGEN COMPOUNDS

95. Refrigerant R-22

96. $COCl_2$, carbonyl chloride

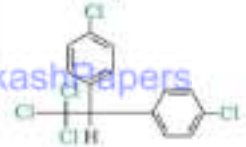
97. $COCl_2 + HCl$

98. Freon 12

99. CCl_2F_2

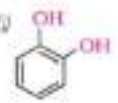
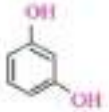
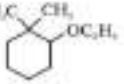
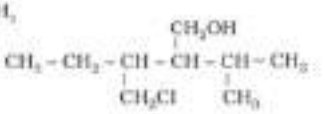
100. Swarts reaction

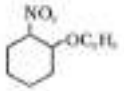
101. Dichlorodiphenyl-trichloro-ethane



Chapter 5
ALCOHOLS, PHENOLS AND ETHERS

INTRODUCTION

1. Allylic and benzylic alcohols may be primary, secondary or tertiary. T/F
2. Draw sec-Butyl alcohol
3. Common name of $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$ is -
4. Draw isobutyl alcohol
5. For naming polyhydric alcohols, the 'e' of alkane is replaced by 'ol'. T/F
6. Draw ortho-cresol
7. Common name of - (i)  (ii)  (iii) 
8. Draw Anisole (NEET)
9. Draw Phenetole
10. Common name of - $C_6H_5-O-CH_2-CH_2-\underset{\underset{CH_3}{|}}{CH}-CH_3$
11. IUPAC name of - (i)  (ii) 

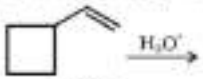
(iii)  (iv) $H_2C=CH-\underset{\underset{OH}{|}}{CH}-CH_2-CH_2-CH_3$

12. The bond angle in alcohols is slightly more than the tetrahedral angle. T/F
13. Bond angle in ether is slightly higher than alcohol because -

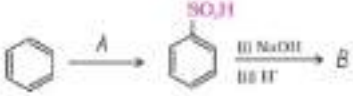
ALCOHOLS AND PHENOLS

PREPARATION OF ALCOHOLS

14. $CH_3-CH=CH_2 \xrightarrow[D_2O]{H_2O}$
15. $CH_3-CH=CH_2 \xrightarrow[H_2O]{D_2O}$

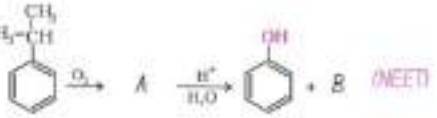
16. _____ on reaction with B_2H_6 give trialkyl boranes.
17. Syn/Anti addition takes place in B_2H_6.
18. Hydroboration oxidation Rxn follow markovnikov/anti-markovnikov rule.
19. Ring expansion and rearrangement takes place in HBO (Hydroboration-oxidation). T/F
20. $CH_3-CH=CH_2 + (BH_3)_2 \xrightarrow{H_2O/OH^-}$
21. $CH_3-CO-CH=CH_2 + (BH_3)_2 \xrightarrow{H_2O/OH^-}$
22. Reagents used in Oxymercuration demercuration (OMDM) rxn are - (2)
23. Syn/anti addition takes place in OMDM.
24. No ring expansion and rearrangement takes place in OMDM. T/F
25. $CH_3-CH=CH_2 + H_2O \xrightarrow{Hg(CH_3COO)_2/NaBH_4}$
26. 
27. 
28. 
29. $RCHO + H_2/Pd \rightarrow$
30. $RCOR' + NaBH_4/H_2O \rightarrow$
31. Esters, carboxylic acids and acid chloride are only reduced by $LiAlH_4/NaBH_4$.
32. $LiAlH_4$ and $NaBH_4$ do not reduce C=C. T/F
33. Reducing agents which reduce π bond are - (4)
34. Ester $\xrightarrow{LiAlH_4/H_3O^+}$
35. $CH_3CHO \xrightarrow{LiAlH_4/H_3O^+}$
36. $CH_3CHO \xrightarrow{LiAlH_4/H_3O^+}$
37. Commercially acids are converted to alcohol by -
38. $R-CO-R + R'-MgX$ after hydrolysis give -
39. Ester on rxn with Grignard reagent produces 1°/2°/3° alcohol

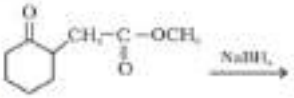
PREPARATION OF PHENOLS

40. Phenol is also known as -
41. $A + NaOH \xrightarrow{625K/300atm} B$. B on acidification → Phenol. Identify A & B.
42. 

43. 

44. Draw cumene.

45.  (NEET)

46. 

PHYSICAL AND CHEMICAL PROPERTIES

47. The solubility of alcohol decreases with increase in size of the alkyl/aryl group. T/F

48. Phenol is more acidic than alcohol. T/F

49. Water is more acidic than methanol. T/F

50. Phenol is a stronger acid than water. T/F

51. Phenol molecules are more stable than phenoxide ions. T/F

52. Arrange o-nitrophenol, p-nitrophenol, m-nitrophenol in order of acidic strength.

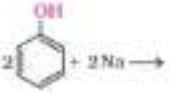
53. Arrange o-fluorophenol, p-fluorophenol, m-fluorophenol in order of acidic strength.

54. Arrange o-cresol, p-cresol and m-cresol in order of acidic strength.

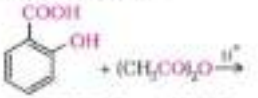
55. Arrange o-methoxyphenol, p-methoxyphenol and m-methoxyphenol in order of acidic strength.

CHEMICAL REACTION OF ALCOHOL

56. $ROH + Na \rightarrow$

57. 

58. The reaction with acid chloride is carried out in the presence of a _____ so as to neutralise HCl which is formed during the reaction.

59. 

60. Arrange Cl-, OH-, RO- and R-CO-O- in order of their leaving tendency.

61. Lucas reagent is - (NEET)

62. Lucas test is a test to find -

63. How does Lucas reagent differentiate between 1°,2°,3° alcohol? (NEET)

64. How does Lucas reagent cause turbidity ?

65. Order of 1°, 2°, 3° alcohol in its ease of dehydration is -

66. Dehydration of alcohol happens by treating it with - (S)

67. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{C}}-\underset{\underset{C_2H_5}{|}}{\overset{\overset{OH}{|}}{C}}-C_2H_5 \xrightarrow{H^+}$

68. RCH2OH (in presence of acidified KMnO4) →

69. RCH2OH (in presence of CrO3) →

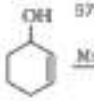
70. CH3-CH=CH-CH2OH (in presence of PCC) →

71. Sec-alcohols are oxidised to _____ in CrO3

72. RCH2OH $\xrightarrow{Cu/573K}$

73. R-CHOH-R' $\xrightarrow{Cu/573K}$ (NEET)

74. ? $\xrightarrow[573K]{Cu} CH_3-\underset{\underset{CH_3}{|}}{C}=CH_2$

75.  $\xrightarrow{MnO_2}$

76. MnO2 oxidises only allylic or benzylic alcohol T/F

CHEMICAL REACTIONS OF PHENOL

77. Ortho and para nitrophenol can be separated by _____ technique. (NEET)

78. p-nitrophenol has intra/intermolecular H bonding

79. Direct nitration of phenol by conc. HNO3 gives poor yields of picric acid T/F

80. To get good yields of picric acid, what is done?

81. Major and minor products formed are -  $\xrightarrow[273\,K]{Br_2 \text{ in } CS_2}$

82. Phenol + Br2/H2O → A. Identify A and also its colour

83.  $\xrightarrow{NaOH}$ A $\xrightarrow[\text{III } H^+]{\text{(i) } CO_2}$ B

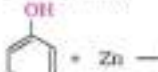
84. Reagents in Reimer-Tiemann reaction are -

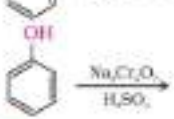
85.  $\xrightarrow{CHCl_3 + \text{aq NaOH}}$ (NEET)

86. Intermediate electrophile formed in Reimer-Tiemann reaction that attack benzene is - (NEET)

ANSWERS 2 ANSWERS 3

87 

88 

89 

SOME COMMERCIALLY IMPORTANT ALCOHOLS

90. Methanol is also known as -

91. $CO + 2H_2 \xrightarrow[200\text{-}300\ atm,\ 573\text{-}673\ K]{ZnO\text{-}Cr_2O_3}$

92. $C_{12}H_{22}O_{11} + H_2O \rightarrow$ Glucose + Fructose, enzyme used in this rxn -

93. Glucose $\rightarrow C_2H_5OH + CO_2$, enzyme used in this rxn -

94. Action of zymase is inhibited once the % of alcohol formed reaches ___%.

95. Commercial alcohol is made unfit for drinking by mixing - (2)

96. The above process is called -

ETHERS

PREPARATION OF ETHERS

97. $CH_3CH_2OH \xrightarrow{H_2SO_4/443K}$

98. Alcohol in low temp. conditions form ether. T/F

99. Ether formation is a S_N1/S_N2 reaction.

100. Write Williamson synthesis reaction - (NEET)

101. If 3° alkoxide ion is used, no ether is formed. T/F

102. If 3° alkyl halide is used, no ether is formed. T/F

103. The B.P. of alcohol is less than ether for the same molar mass. T/F

CHEMICAL REACTIONS

104. Least reactive functional group is -

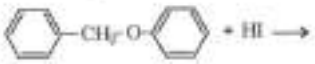
105. Aryl-oxygen bond is more stable than alkyl-oxygen bond. T/F

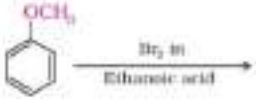
106. The order of reactivity of hydrogen halides with ether is -

107. $CH_3\text{-}O\text{-}CH_2\text{-}CH_3 + HI \rightarrow$

108. If a tertiary alkyl group is present in the ether, the reaction process through ____ mechanism, otherwise it proceed through ____

109. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-O-CH_3 + HI \longrightarrow$

110.  $+ HI \longrightarrow$

111. 

112. Victor meyer test is not given by (1°/ 2°/ 3° alcohol (NEET)

113. Aspirin is acetylation product of - (NEET)

114. Oil of winter green is - (NEET)

ANSWERS

• INTRODUCTION

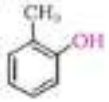
1. T

2. $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2-CH_3$

3. Isopropyl alcohol

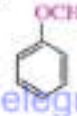
4. $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH$

5. F

6. 

7. Catechol, resorcinol, hydroquinone or quinol

8. 

9. 

10. Phenyl isopentyl ether

11. (i) 2-Ethoxy-(1)-dimethylcyclohexane

(ii) 1-Ethoxy-2-nitrocyclohexane

(iii) 4-Chloro-3-ethyl-2-(1-methylethyl)-butan-1-ol

(iv) Hex-1-en-3-ol

12. F

13. Of repulsion between bulky alkyl groups on either side of O

• ALCOHOLS AND PHENOLS

14. $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2D$

15. $CH_3-\underset{\underset{OD}{|}}{CH}-CH_3$

16. Alkene

17. Syn

18. Anti-markownikov rule

19. F

20. $CH_3-CH_2-CH_2-OH$

21. $CH_3-CO-CH(OH)-CH_3$. this product is formed because the terminal carbon have partial +ve charge due to resonance with C=O

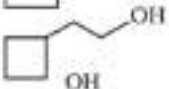
22. $Hg(CH_3COO)_2/NaBH_4$

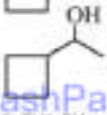
23. Anti

24. T

25. $CH_3-CH(OH)-CH_3$

26. 

27. 

28. 

29. R-CH2-OH

30. R-CH(OH)-R'

31. $LiAlH_4$

32. T

33. Pd/H2, B2H6, Na/Ethanol, Raney Ni/H2

34. Alcohol

35. $CH_3-CH(OH)-D$

36. CH_3-CH_2-OD

37. By converting them to esters followed by reduction using H2/Pd (or any other metal)

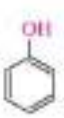
38. $RCOR + R'MgX \longrightarrow R-\underset{\underset{R}{|}}{\overset{\overset{R'}{|}}{C}}-OMgX \xrightarrow{H_2O} R-\underset{\underset{R}{|}}{\overset{\overset{R'}{|}}{C}}-OH + Mg(OH)X$

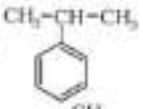
39. 3°

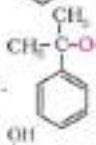
40. Carbolic acid

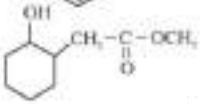
41. A -  B - 

42. A - Oleum, B - Phenol

43. A -  B - 

44 

45. A -  B - CH_3COCH_3

46. 

47. T

48. T

49. F

50. T

51. F

52. p-nitrophenol > o-nitrophenol > m-nitrophenol

53. o > p > m

54. m > p > o

55. m > o > p

56. R-O-Na

57.  + H_2

58. base(pyridine)

59 

60. Cl^- > R-CO-O- > OH- > RO- [Tip - Strong acid have good leaving conjugate base. As HCl > RCOOH > H2O > ROH in terms of acidity, their conjugate base stability order is also the same and hence the leaving tendency]

61. ZnCl2/HCl

62. the 'degree' of alcohol, i.e. 1°, 2°, 3°

63. 1° alcohol - No turbidity, 2° alcohol - Turbidity after 5 min, 3° alcohol - turbidity immediate

64. R-OH + Lucas reagent → R-X, which in insoluble in Lucas reagent hence give turbidity

65. 3° > 2° > 1°

66. Protic acid (eg. -Conc. H2SO4 or H3PO4), P2O5/Δ, Al2O3/Δ, ZnCl2, POCl3/Pyridine

67 This is pinacole pinacolone rearrangement reaction

68. R-COOH

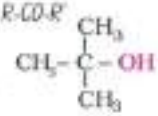
69. RCHO

70. CH_3-CH_2-CH-CHO

71. Ketone

72. RCHO

73. R-CO-R'

74 

75 

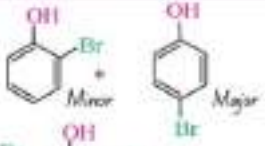
76. T

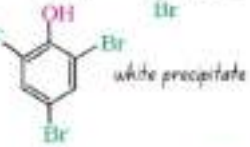
77. Steam distillation

78. Intermolecular H bonding

79. T

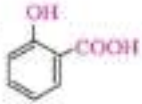
80. First phenol is sulphonated then nitrated

81. 

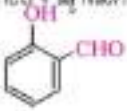
82. 

white precipitate

83. A - 

B - 

84. $CHCl_3$ + aq NaOH

85. 

86. CCl_2 (dichlorocarbene)

87. 

88.  + ZnO

89. 

90. Wood spirit

91. CH_3OH

92. Invertase

93. Zymase

94. 14

95. $CuSO_4$ (to give it a colour) and pyridine (a foul smelling liquid)

96. Denaturation of alcohol

• ETHERS

97. $CH_2=CH_2$

98. T

99. S_N2

100. $R\text{-}X + R\text{-}O\text{-}Na^+ \rightarrow R\text{-}O\text{-}R' + NaX$

101. F

102. T

103. F

104. Ether

105. T

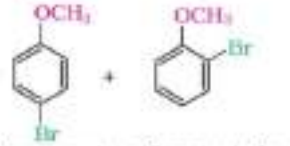
106. HI > HBr > HCl

107. $CH_3\text{-}I$, $CH_3\text{-}CH_2\text{-}OH$

108. S_Ni, S_N2

109. $CH_3OH + CH_3-\underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}-I$

110. 

111. 

p-Bromoanisole (Major) o-Bromoanisole (minor)

112. 3° [Victor mayer give red colour with 1°, blue colour with 2° and remains colourless with 3° alcohol as no reaction with HNO_2 occur]

113. Salicylic acid

114. Methyl salicylate

Chapter 6

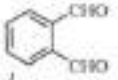
ALDEHYDES, KETONES AND CARBOXYLIC ACIDS

ALDEHYDES AND KETONES

INTRODUCTION

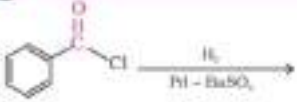
1. Vanillin structure -
2. Salicylaldehyde structure -
3. Name the structure - 

4. Benzophenone structure -
5. Name this structure - 

6. Draw 3-Oxopentanal
7. Pentane-1,5-dial structure
8. Draw propane-1,2,3-tricarbaldehyde
9. Valeraldehyde structure -
10. Acrolein structure -
11. Name the structure - 

12. Isophthalaldehyde structure -
13. Terephthaldehyde structure -
14. Mesityl oxide formula -
15. Acetaldehyde formula -
16. Formaldehyde formula -

PREPARATION OF ALDEHYDES AND KETONES

17.  (NEET)

18. Above reaction is called -
19. Write Wacker process reaction - (NEET)
20. RCN + SnCl2 + HCl → A + H3O+ → RCHO. Find A. (NEET)

21. Reaction in the previous question is called -

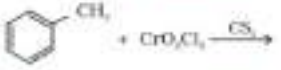
22. DIBAL-H full form is -

23. DIBAL-H do not attack on double bond because -

24. $RC{\equiv}N \xrightarrow[2.\ H_2O]{1.\ AlHI\text{-}Bu_2}$

25. $CH_3-CH{=}CH\text{-}CH_2CH_2\text{-}CN \xrightarrow[2.]{1.} CH_3-CH{=}CH\text{-}CH_2CH_2\text{-}CHO$

26. $CH_3(CH_2)_5-\overset{O}{\overset{\|}{C}}-OC_2H_5 \xrightarrow[2.\ H_2O]{1.\ DIBAL\text{-}H}$

27.  (NEET)

28. Above reaction is called - (NEET)

29.  (NEET 2013)

30.  (NEET 2020)

31.  (NEET)

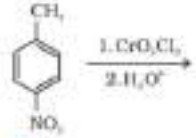
32. Above reaction is called -

33. $RMgX + CdCl2 \rightarrow$

34. $R'COCl + R2Cd \rightarrow$

35. $CH_3-CH_2-C{\equiv}N + C_2H_5MgBr \xrightarrow{ether} CH_3CH_2-C(=NMgBr)(C_2H_5) \xrightarrow{H_2O^+}$

36. $(C6H5CH2)2Cd + 2CH3COCl \rightarrow$

37. 

PHYSICAL PROPERTIES

38. The boiling points of aldehydes and ketones are higher than hydrocarbons and ethers of comparable molecular masses. T/F

39. Compare the b.p. of alcohol, ether, ketone, aldehyde, hydrocarbons when they have almost the same molecular mass

40. Methanal is a gas/liquid

41. Ethanol is a gas/liquid.

42. Aldehyde from H-bond with water. T/F

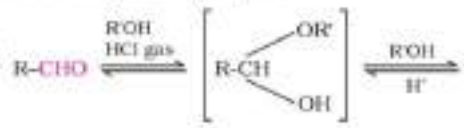
CHEMICAL REACTIONS

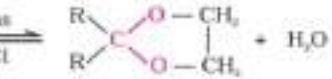
Nucleophilic addition & reduction

43. Ketones are generally more reactive than aldehydes in nucleophilic addition reactions. T/F

44. 

45. Acetals are gem-dialkoxy compounds. T/F

46. 

47. A + B 

48. What is the function of dry HCl in the above reaction?

49. 

50. Schiff's base is - (NEET)

51. Name the reagent and product name of each species of compounds

X	Reagent name	Carbonyl derivative	Product name
-H		C=NH	
-R		C=NR	
—OH		C=N-OH	
—NH_2		C=N-NH_2	
—HN-Ph		C=N-NH-Ph	
—HN-(2,4-$(NO_2)_2$-Ph)		C=N-NH-(2,4-$(NO_2)_2$-Ph)	
—NH—C(=O)—NH_2		C=N-NH—C(=O)—NH_2	

52. 2,4-DNP test is for -

53. _____ colour solution is obtained if 2,4-DNP test is positive

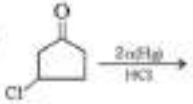
54. $>C{=}O \xrightarrow[HCl]{Zn\text{-}Hg}$

55. Above reaction is called - (NEET)

56. $>C{=}O \xrightarrow[-H_2O]{NH_2NH_2} ? \xrightarrow[heat]{?} >CH_2 + N_2$ (NEET)

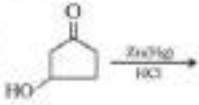
57. Above reaction is called - (NEET)

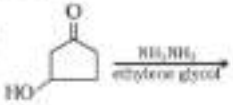
58. 

59. 

60. 

61. 

62. 

63. 

Oxidation

64. Tollens and Fehlings reagent oxidise aldehydes. T/F

65. What is Tollen's reagent ?

66. Tollen's test and fehling test are used to distinguish -

67. Tollen's test for fructose is -ve. T/F

68. If the tollens test is +ve _____ is produced (NEET)

69. Tollens and fehling tests occur in acidic/alkaline medium

70. Write the Tollens test reaction

ANSWERS 2

71. Fehling test is +ve for - (2)

72. Fehling solution A is _____ and fehling solution B is _____

73. Rochelle salt is called -

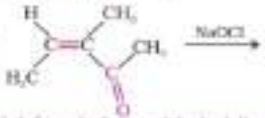
74. On heating an aldehyde with Fehling's reagent, _____ colour precipitate is obtained

75. Write the reaction of the Fehling test

76. Aromatic aldehyde also give fehling test T/F

77. In benedict's test, instead of rochelle salt, _____ is used and all other things are same as fehling test

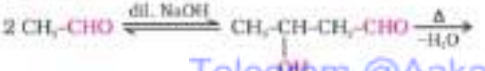
78. 

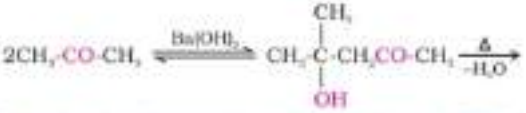
79. 

80. Iodoform test is used to test the presence of _____ and _____ group (NEET)

Aldol condensation & Cannizzaro

81. β-hydroxy ketones are called -

82. 

83. 

84. Reagents and conditions used in aldol condensation are - (NEET)

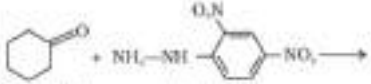
85. 

86. RDS (rate determining step) in cannizzaro is -

87. Reagents used in cannizzaro are -

88. Benzaldehyde + Formaldehyde + conc. NaOH →

89. The small/big aldehyde unit in cannizzaro is oxidised T/F

90. 

91. Benzaldehyde are used in - (2)

92. Acetaldehyde is used primarily as a starting material in the manufacture of - (5)

CARBOXYLIC ACID

INTRODUCTION

93. Common name of CH_3CH_2COOH -

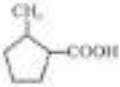
94. Oxalic acid upac name is -

95. Malonic acid formula -

96. Adipic acid formula -

97. From ethanedioic acid to hexanedioic acid, tell the common name of each acid

98. Phenylacetic acid structure -

99. IUPAC name of - (i)  (ii) $Ph\text{-}CH_2CH_2COOH$

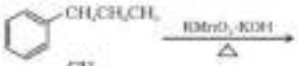
PREPARATION OF CARBOXYLIC ACIDS

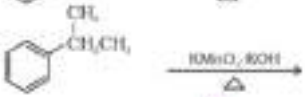
100. Primary alcohol are oxidised to carboxylic acid by - (3) (NEET)

101. Jones reagent is -

102. $RCH_2OH \xrightarrow[2.\ H_3O^+]{1.\ \text{alkaline } KMnO_4}$

103. 

104. 

105. 

106. $R\text{-}CN \xrightarrow[H_2O]{\overset{+}{H}\text{ or }\bar{O}H} R\text{-}\overset{O}{\overset{\|}{C}}\text{-}NH_2 \xrightarrow[\Delta]{\overset{+}{H}\text{ or }\bar{O}H}$

107. $CH_3CONH_2 \xrightarrow[\Delta]{\overset{+}{H_3O}}$

108. 

109. $R\text{-}Mg\text{-}X + O{=}C{=}O \xrightarrow{\text{Dry ether}} A \xrightarrow{H_3O^+} B$ Identify A & B. (NEET)

110. Benzoic anhydride on hydrolysis give -

111. 

112. RCCl3 + A → RCOOH. What is A ?

113. R-C≡C-R' + A → RCOOH + R'COOH. What is A ?

114. $CH_2{=}CH_2 + CO + H_2O \xrightarrow{[H_2PO_4/573K\text{-}613K]}$

115. The above reaction is called _____ and it follows the markovnikov/anti-markovnikov mechanism

116. $R\text{-}CH(COOH)_2 \xrightarrow{\Delta}$

117. How to convert cyclohexane to hexane-1,6-dioic acid ?

118. Convert 2-Nitrobromobenzene to 3-Nitrobenzoic acid

PHYSICAL PROPERTIES

119. Upto ___ carbons carboxylic acids exist as liquids

120. Carboxylic acids have b.p. even higher than alcohols of comparable molecular masses. T/F

121. The reason of the above statement is - (NEET)

122. Carboxylic acids are soluble in water upto __ carbons

CHEMICAL REACTIONS

123. Carboxylic acids are less acidic than phenols. T/F

124. Any substitution at ortho position will decrease the acidic strength of benzoic acid. T/F

125. Arrange the groups NO2, CN, CF3, Ph, I, Br, Cl, I in increasing acidity order when they are attached to carboxylic acids. (NEET)

126. Direct attachment of groups such as phenyl or vinyl to the carboxylic acid increases the acidity of corresponding carboxylic acid. T/F

127. The reason for the increase in acidity is because of resonance. T/F

128. The reason for increase in acidity is -

129. $H_3C\text{-}C(=O)\text{-}OH + HO\text{-}C(=O)\text{-}CH_3 \xrightarrow[\text{or } P_2O_5]{H^+,\ \Delta}$

130. Esterification is a kind of electrophilic/nucleophilic substitution

ANSWERS 3 ANSWERS 4

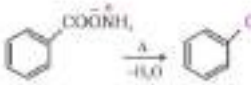
131. $RCOOH + A \rightarrow RCOCl + POCl_3 + HCl$. Identify A.

132. $RCOOH + PCl_5 \rightarrow$ (NEET)

133. $RCOOH + SOCl_2 \rightarrow$ (NEET)

134. Why is $SOCl_2$ preferred while forming acid chloride from carboxylic acid ?

135. $CH_3COOH + NH_3 \rightleftharpoons A \xrightarrow[-H_2O]{\Delta} B$ What are A & B ?

136. A + B $\rightleftharpoons$  (NEET)

137. $NaBH_4$ does not reduce the carboxyl group. T/F

138. Carboxylic acids are reduced by – (2)

139. Diborane can easily reduce functional groups such as ester, halo etc. T/F

140. $R\text{-}COONa \xrightarrow[\text{Heat}]{NaOH \ \& \ CaO}$

141. $R\text{-}CH_2\text{-}COOH \xrightarrow[\text{III}]{\text{II}} R\text{-}\underset{\underset{X}{|}}{CH}\text{-}COOH$ (NEET)

142. The above reaction is called

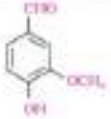
143.  T/F

144. 

145. Adipic acid when heated form –

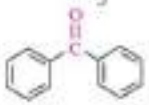
ANSWERS

• ALDEHYDES AND KETONES

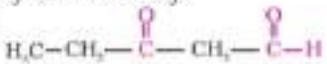
1. 

2. 

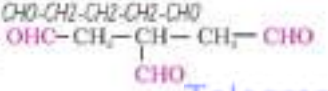
3. Cinnamaldehyde

4. 

5. Cyclohexanecarbaldehyde

6. 

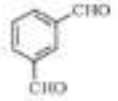
7. CHO-CH2-CH2-CH2-CHO

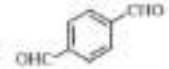
8. 

9. CH3-CH2-CH2-CH2-CHO

10. CH2=CH-CHO

11. Phthalaldehyde

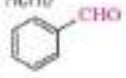
12. 

13. 

14. (CH3)2C=CHCOCH3

15. CH3CHO

16. HCHO

17. 

18. Rosenmund reduction

19. R-CH=CH2 + PdCl2 [Air/H2O/CuCl2] → R-CO-CH3 + Pd + HCl

20. RCH=NH

21. Stephen reaction

22. Diisobutylaluminium hydride

23. H- given by DIBAL-H have high electron density which cause repulsion with double bond

24. RCHO

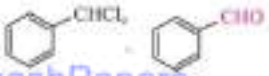
25. 1. AlHi-BuI2 2. H2O

26. 

27. 

28. Etard reaction

29. 

30. 

31. A - CO, HCl B - anhyd. AlCl3/CuCl

32. Gattermann-Koch reaction

33. R2Cd + MgX2

34. R'-CO-R + CaCl2

35. 

36. C6H5-CH2-CO-CH3

37. 

38. T

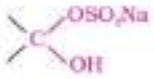
39. Alcohol > Ketone > Aldehyde > Ether > Hydrocarbon

40. Gas

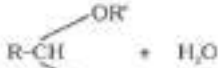
41. Volatile liquid

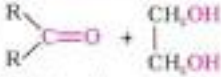
42. T

43. F

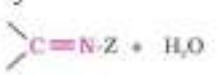
44. 

45. T

46. 

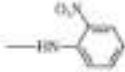
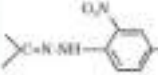
47. 

48. Protonates the oxygen of the carbonyl compounds and therefore increase the electrophilicity of the carbonyl carbon

49. 

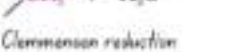
50. Substituted imine

51.

Z	Reagent name	Carbonyl derivative	Product name
-H	Ammonia		Imine
-R	Amine		Substituted imine (Schiff's base)
-OH	Hydroxylamine		Oxime
$-NH_2$	Hydrazine		Hydrazone
	Phenylhydrazine		Phenylhydrazone
	2,4-Dinitrophenyl-hydrazine		2,4-Dinitrophenyl-hydrazone
	Semicarbazide		Semicarbazone

52. Carbonyl group

53. Red orange colour

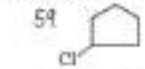
54. 

55. Clemmensen reduction

56. , KOH/ethylene glycol + heat

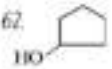
57. Wolff-Kishner reduction

58. 

59. 

60. 

61. 

62. 

63. 

64. T

65. Ammoniacal silver nitrate solution

66. Aldehydes from ketones, all aldehydes given +ve tollens and fehling test

67. F, tollen's test is +ve for fructose even when it is a ketone because α-hydroxy ketone get oxidised by tollens test, the hydroxyl group get oxidised

68. Bright silver mirror

69. Alkaline

70. $RCHO + 2[Ag(NH_3)_2]^+ + 3OH^- \rightarrow RCOO^- + Ag + H_2O + 4NH_3$

71. Aliphatic aldehyde and β-hydroxy ketone

72. A - Aqueous copper sulphate, B - Rochelle salt

73. Alkaline sodium potassium tartrate

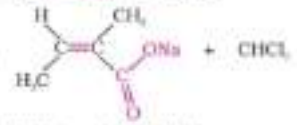
74. Reddish brown

75. $R\text{-}CHO + Cu2+ + OH- \rightarrow RCOO- + Cu2O + H2O$

76. F

77. Sodium potassium citrate

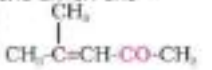
78. 

79. 

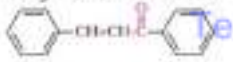
80. $CH3CO-$ and $CH3CH(OH)-$

81. Ketal

82. $CH3\text{-}CH=CH\text{-}CHO$

83. 

84. dilNaOH or any base in the 1st reaction, dehydration by heating in the 2nd reaction

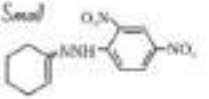
85. 

86. Hydride shift

87. Conc. NaOH/KOH

88. Benzyl alcohol + Formic acid

89. Small

90. 

91. Perfumery and dye industry

92. Acetic acid, ethyl acetate, vinyl acetate, polymers and drugs

• CARBOXYLIC ACID

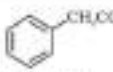
93. Propanoic acid

94. Ethanedioic acid

95. $HOOC\text{-}CH2\text{-}COOH$

96. $HOOC\text{-}(CH2)4\text{-}COOH$

97. Oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid (Mnemonic - OM Shanti Gas)

98. 

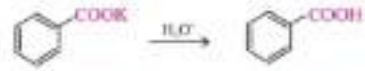
99. (i) 2-Methylcyclopentanecarboxylic acid

(ii) 3-Phenylpropanoic acid

100. KMnO4, K2Cr2O7 and Jones reagent

101. CrO3 in acidic media

102. RCOOH

103. 

104. 

105. gives nothing as tertiary group is not affected

106. RCOOH

107. $CH3COOH + NH3$

108. 

109. $R\text{-}COO\text{-}MgX+$, RCOOH

110. 2. $C6H5COOH$

111. 

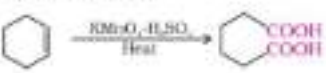
112. $AgKOH/H2O$

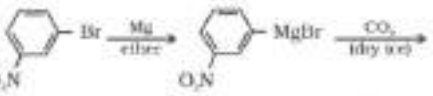
113. Hot conc. $KMnO4/H+$

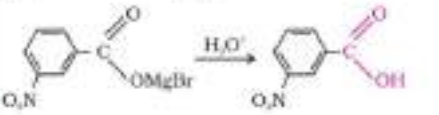
114. $CH3\text{-}CH2\text{-}COOH$

115. Koch reaction, markovnikov

116. $R\text{-}CH2\text{-}COOH + CO2$

117. 

118. 



119. 9

120. T

121. This is due to more extensive association of carboxylic acid molecules through intermolecular H bonding

122. 4

123. F

124. F

125. Ph < I < Br < Cl < F < CN < NO2 < CF3

126. T

127. F

128. High electronegativity of sp2 hybridised C to which -COOH is attached

129. 

130. Electrophilic

131. PCl3

132. RCOCl

133. RCOCl + SO2 + HCl

134. Because the other products are gaseous and escape the reaction mixture

135. A -CH3COO-NH4+, B -CH3CONH2

136. 

137. T

138. LiAlH4 or B2H6

139. F

140. R-H + Na2CO3

141. (i) - X2/Red phosphorus; (ii) - H2O

142. Hell-Volhard-Zelinsky reaction

143. F. No reaction. They do not reaction because the catalytic aluminium chloride gets bounded to carboxylic acid

144. 

145. Cyclopentanone  . (Blanc's rule)

Chapter 7
AMINES

INTRODUCTION

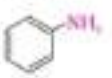
1. _____ and _____ both containing a secondary amino group, are used to increase blood pressure.
2. _____ a synthetic amino compound is used as an anaesthetic in dentistry.
3. Draw alkylamine.
4. Common name of NH3-(CH2)6-NH3 -
5. o-Toluidine structure -
6. IUPAC name of 

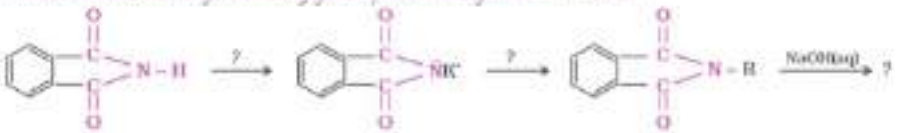
PREPARATION OF AMINES

7. Nitro compounds are reduced to amines by passing hydrogen gas in the presence of finely divided nickel, palladium or platinum. T/F

8. 

(NEET)

9. ? 

10. Reduction of nitro compounds with iron scrap and hydrochloric acid is preferred. T/F
11. The reason of above statement is -
12. Electrolytic reduction of nitrobenzene in strongly acidic solution yield - (NEET)
13. Electrolytic reduction of nitrobenzene in weakly acidic solution yield - (NEET)
14. Ammonolysis is carried out in a sealed tube at 373K. T/F
15. The order of reactivity of halides with amines is RCl > RBr > RI. T/F
16. R-CN ⟶ R-CH2-NH3. Reagents used in this reaction are - (NEET)
17. R-CONH2 ⟶ R-CH2-NH3. Reagents used in this reaction are -
18. Phthalimide structure -
19. Aromatic amines can be synthesized by gabriel phthalimide synthesis. T/F (NEET)
20. 

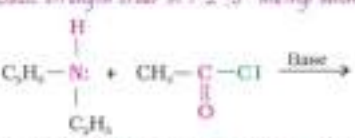
21. 1°/2°/3° amines are prepared by Gabriel phthalimide synthesis.
22. 1°/2°/3° amines are prepared by Hoffmann bromamide degradation.
23. Reagent in Hoffmann bromamide degradation are - (NEET)
24. Write Hoffmann bromamide degradation reaction.
25. The product and reactant contains equal no. of carbons in Hoffmann bromamide degradation. (NEET)
26. Retention/inversion occur in Hoffmann bromamide degradation.

PHYSICAL PROPERTIES

27. Primary amines with ___ number of carbon or less are gaseous.
28. Lower aliphatic amines are soluble in water because -
29. The order of boiling point in 1°, 2°, 3° isomeric amines is -
30. Amines have higher boiling point than alcohol with almost the same molecular mass. T/F

CHEMICAL REACTIONS

31. Amine salts are soluble in water but insoluble in organic solvents. T/F
32. pKb of Ethanamine is larger than that of Benzenamine. T/F (NEET)
33. The basic strength on any alkyl amine depends upon - (3)
34. Basic strength order of 1°,2°,3° amine in gaseous phase is -
35. Basic strength order of 1°,2°,3° ethyl amine in aqueous solution -
36. Basic strength order of 1°,2°,3° methyl amine in aqueous solution - (NEET)

37. 

38. The above reaction occur in the presence of base like _____ whose function is -

39. 

40. $CH_3NH_2 + C_6H_5COCl \rightarrow$

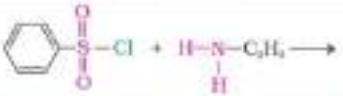
41. $R-NH_2 + CHCl_3 + 3KOH \xrightarrow{Heat}$ (NEET)

42. The above reaction is called _____ and used as a test for _____ (NEET)
43. Carbylamine test can only be given by 1° amines. T/F (NEET)

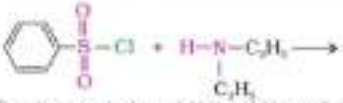
44. $R-NH_2 + HNO_2 \xrightarrow{NaNO_2 + HCl} A \xrightarrow{H_2O} B$ Tell A & B.

45. The above reaction is used for the qualitative/quantitative estimation of amino acids and proteins.
46. Structure and name of Hinsberg's reagent is -
47. Hinsberg's reagent cannot react with 1°/2°/3° amine. (NEET)

ANSWERS 1 ANSWERS 2

48. 

49. The above product is soluble/insoluble in alkali. (NEET)

50. 

51. The above product is soluble/insoluble in alkali

52. _____ was earlier used to differentiate between 1°, 2°, 3° amine. (NEET)

53. Nowadays, benzenesulfonyl chloride is replaced by _____ for differentiating between 1°, 2°, 3° amine.

54. 

55. The colour of precipitate formed in above reaction is -

56. To obtain mono-substituted aniline, activating effect of -NH2 group is controlled by -

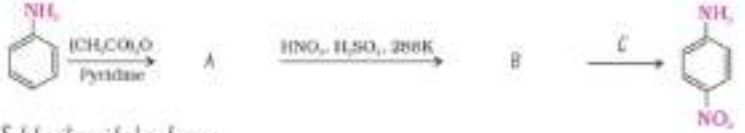
57. 

(NEET)

58. What is the function of pyridine and CH3COOH in the above reaction ?

59. Anilinium ion is ortho/meta directing. (NEET)

60. 
The major products formed are - (NEET)

61. 

62. Sulphanilic acid structure -

63. 

64. Aniline doesn't undergo friedel-crafts alkylation and acylation. T/F

65. The reason of above statement is -

DIAZONIUM SALT

66. Write the reaction of preparation of benzenediazonium salt with all the reagent used and temp. specified.

67. In situ preparation of _____ occur in above reaction.

68. Benzenediazonium chloride is readily soluble in water. T/F

69. Benzenediazonium fluoroborate is water insoluble and unstable at room temperature. T/F

70. In sandmeyer reaction, reagents used are -

71. Write the Gatterman reactions -

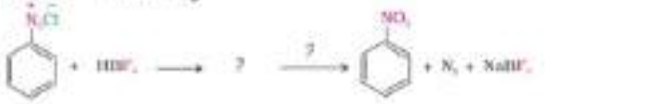
72. The yield in Gatterman reactions is more than Sandmeyer reactions. T/F

73. $ArN_2^+Cl^-$ → ArI, using -

74. $ArN_2^+Cl^-$ → ArF, using - (NEET)

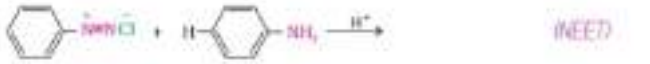
75. $ArN_2^+Cl^-$ → benzene, using - (2) (NEET)

76. $ArN_2^+Cl^-$ → ArOH, using -

77. 

78. 

79. Colour of product in above reaction -

80.  (NEET)

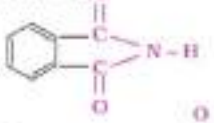
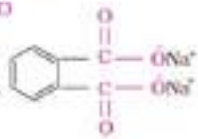
81. Colour of product in above reaction -

ANSWERS

• INTRODUCTION

1. Adrenaline and ephedrine
2. Novocain
3. $NH_2-CH_2-CH=CH_2$
4. Hexamethylenediamine
5. 
6. N,N-Dimethylbenzenamine

• PREPARATION OF AMINES

7. T
8. H_2/Pd ethanol
9. 
10. T
11. $FeCl_2$ formed gets hydrolysed to release hydrochloric acid during the reaction. Thus only a small amount of hydrochloric acid is required to initiate the reaction
12. p-aminophenol
13. aniline
14. T
15. F, it is RI > RBr > RCl
16. $LiAlH_4$/H_2O or H_2/Ni or Na(Hg)/C_2H_5OH
17. $LiAlH_4$/H_2O
18. 
19. F
20. KOH, R-X 

• PHYSICAL PROPERTIES

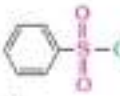
27. 2
28. They can form H-bond with water molecules
29. 1° > 2° > 3°, this order is because of presence of more H-bonding in 1° amines than 3° amines
30. F

• CHEMICAL REACTIONS

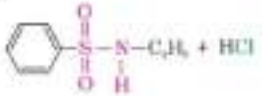
31. T
32. F
33. (i) Inductive effect
    (ii) Solvation effect
    (iii) Steric hindrance
34. 3° > 2° > 1°
35. 2° > 3° > 1°
36. 2° > 1° > 3° [Trick - Ethyl - 2]1, Methyl - 2]3, as 2]1>2]3 and carbon in Ethyl > Methyl]
37. $C_2H_5-\underset{\underset{C_2H_5}{|}}{N}-\underset{\underset{O}{||}}{C}-CH_3 + H-Cl$
38. Pyridine, N-Ethylethanamide
39. $C_2H_5-\underset{\underset{H}{|}}{N}-\underset{\underset{O}{||}}{C}-CH_3 + CH_3COOH$
40. $CH_3NHCOC_6H_5 + HCl$
41. $R-NC + KCl + H_2O$
42. Carbylamine or isocyanide test, primary amines
43. T

44. A - [R-N2+Cl-], B - ROH + N2 + HCl

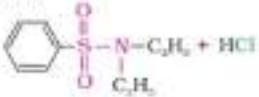
45. Quantitative

46.  , Benzenesulfonyl chloride

47. 3°

48. 

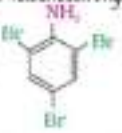
49. Soluble

50. 

51. Insoluble

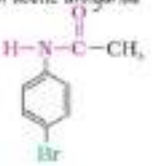
52. Hinsberg reagent (Benzenesulfonyl chloride)

53. p-toluenesulfonyl chloride

54.  + 3HBr

55. White precipitate

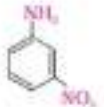
56. Acetylation of -NH2 group with acetic anhydride

57. A - (CH3CO)2O/Pyridine, B - 
C - OH- or H+

58. (i) Pyridine take H+ from -NH2 of aniline to make it more nucleophilic for smooth acetylation

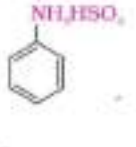
(ii) CH3COOH polarise Br2 so that Br+ ion can be formed easily

59. Meta

60. Major products -  + 

61. A -  , B-  , C - OH- or H+

62. 

63. 

64. T

65. Because of salt formation with AlCl3 as it is a lewis acid

DIAZONIUM SALT

66. C6H5NH2 + NaNO2 + HCl [273-278 K] ⟶ C6H5N2+Cl- + NaCl + H2O

67. HNO2

68. T

69. F, stable at room temp.

70. Cu2Cl2/HCl - for chlorobenzene formation
Cu2Br2/HBr - for bromobenzene formation
CuCN/KCN - for Cyanobenzene formation

71. I ArN2+X- [Cu/HCl] ⟶ ArCl + N2 + CuX
II ArN2+X- [Cu/HBr] ⟶ ArBr + N2 + CuX

72. F

73. KI

74. HBF4/Δ

75. H3PO2, CH3CH2OH

76. H2O

77.  , NaNO2, Cu, heat

78. 

79. Orange dye

80. 

81. Yellow dye

Chapter 8
BIOMOLECULES

CARBOHYDRATES

1. Define Carbohydrates
2. Carbohydrates are classified into categories - (3)
3. Carbohydrates that yield ____ to ____ monosaccharide units on hydrolysis are called oligosaccharide
4. Polysaccharide are called non-sugars. T/F
5. All monosaccharides whether aldose or ketose are reducing sugars. T/F (NEET)
6. 1 carbon aldehyde monosaccharide is called -
7. Commercially glucose is obtained from sucrose/starch
8. Tell the 2 methods of preparation of glucose -
9. Given any one example of aldohexose and ketohexose each
10. _____ is also known as dextrose
11. Glucose on prolonged heating with HI forms -
12. Glucose + $NH_2OH \rightarrow$ (NEET)
13. Glucose + $HCN \rightarrow$
14. Glucose + Br_2 (bromine water) $\rightarrow$

15. Acetylation of glucose with acetic anhydride gives glucose hexaacetate. T/F
16. Glucose on oxidation with HNO_3 gives -
17. 'D' before the name of glucose represents its dextrorotatory nature. T/F
18. (+) isomer of glyceraldehyde has 'L' configuration. T/F
19. Glucose gives Schiff's test. T/F
20. M.p of α-form of glucose is -
21. M.p. of β-form of glucose is -
22. α-form is obtained by crystallisation at ____ K
23. β-form is obtained by crystallization at ____ K
24. The two cyclic forms of glucose exist in equilibrium with open chain structure. T/F
25. In β form, all bulky groups are at equatorial position. T/F
26. α and β form of glucose are called _____ (NEET)
27. Cyclic structure of glucose is analogous to -
28. Glucose belong to D/L series and is a dextrorotatory/laevorotatory compound
29. Fructose belong to D/L series and is a dextrorotatory/laevorotatory compound
30. Cyclic structure of fructose is analogous to -
31. β-form of fructose have a bulky group arranged alternatively. T/F
32. β-form of fructose have bulky groups at equatorial position. T/F

ANSWERS 1

DISACCHARIDES

33. Sucrose contains - (2) (NEET)
34. In sucrose, the glycosidic linkage is between _____ and _____
35. Sucrose is a non-reducing sugar. T/F (NEET)
36. Sucrose is dextrorotatory/laevorotatory before hydrolysis.
37. Sucrose is dextrorotatory/laevorotatory after hydrolysis.
38. Invert sugar other name is _____
39. In maltose, α-form/β-form of glucose is present.
40. The glycosidic linkage in maltose is in between _____ and _____
41. Maltose is reducing/oxidising.
42. _____ is called milk sugar.
43. Lactose is composed of _____ and _____ (NEET)
44. The linkage is between _____ and _____

POLYSACCHARIDES

45. _____ is the main storage polysaccharide in plants.
46. 2 components of starch are-
47. Amylose constitutes about ___-___% of starch.
48. Amylopectin constitutes about ___-___% of starch.
49. Branching in amylopectin occurs at ___-___ glycosidic linkage. (NEET)
50. Most abundant organic substance in plant kingdom is -
51. Cellulose is composed of - (NEET)
52. _____ is also known as animal starch.
53. Glycogen is also found in yeast and fungi. T/F
54. Cell wall of bacteria and plants is made up of cellulose. T/F

PROTEINS

55. _____ are the most abundant biomolecules of the living system.
56. Only β-amino acids are obtained on hydrolysis of proteins. T/F
57. Glycine is so named since it has _____
58. Tyrosine was first obtained from -
59. Name all the amino acids.
60. Name the essential amino acids. (NEET)
61. Basic amino acids are - (2) (NEET)

62. Acidic amino acids are - (2)
63. Amino acids behave like salts rather than simple amines or carboxylic acids. T/F
64. Except _____ all other naturally occurring α-amino acids are optically active.
65. Most naturally occurring amino acids have D/L-configuration.
66. L-Aminoacids are represented by writing the $-NH_2$ group on left/right hand side.
67. Name a dipeptide.
68. Number of amino acids in insulin is -
69. Proteins types on the basis of molecular shape are -
70. Fibrous proteins ex - (2)
71. Keratin is present in - (3)
72. Globular proteins ex - (2)
73. 2 types of secondary structure are -
74. 2 types of tertiary structure are -
75. What is a native protein ?
76. Curdling of milk is actually an example of denaturation of protein. T/F
77. Almost all the enzymes are globular/fibrous proteins.

VITAMINS & NUCLEIC ACIDS

78. Define vitamins.
79. Fat soluble vitamins are - (4) (NEET)
80. Water soluble vitamins are - (2) (NEET)
81. All vitamin Bs cannot be stored except _____
82. Vit A deficiency causes - (2)
83. Vit B1 deficiency cause - (NEET)
84. Vit B2 deficiency cause -
85. Vit B6 deficiency cause -
86. Vit B12 deficiency cause -
87. Vit C deficiency cause -
88. Vit D deficiency cause - (2)
89. Vit E deficiency cause - (2)
90. Vit K deficiency cause -
91. Sugar moiety in DNA is - (NEET)
92. Sugar moiety in RNA is - (NEET)
93. Bases in DNA are - (4)
94. Bases in RNA are - (4)
95. Base attach to 1'/2' position of sugar.

96. Phosphoric acid is attached to the ___ position of sugar to get a nucleotide

97. Nucleic acids have a secondary structure also. T/F

98. _____ and _____ gave a double strand helix structure for DNA

99. Adenine form H bond with _____ and Cytosine form H bond with _____ (NEET)

100. The 3 types of RNA are -

101. Insufficient functioning of adrenal cortex cause _____

102. Addison's disease characterised by - (3)

103. The enzymes which catalyse the oxidation of one substrate with simultaneous reduction of another substrate are named as _____

ANSWERS

• CARBOHYDRATES

1. Carbohydrates are optically active polyhydroxy aldehyde or ketones of the compounds which produce such units on hydrolysis
2. Monosaccharide, Oligosaccharide, Polysaccharide
3. 2-10
4. T
5. T
6. Aldoheptose
7. starch
8. I. By boiling of sucrose with dilute HCl or H_2SO_4 in alcoholic solution
II. Hydrolysis of starch by boiling it with dilute H_2SO_4 at 393K and 2-3 atm
9. Aldohexose - Glucose, Ketohexose - fructose
10. Glucose
11. n-Hexane
12. Oxime
13. Cyanohydrin
14. Gluconic acid
15. F, pentaacetate
16. Saccharic acid
17. F
18. F
19. F
20. 419 K
21. 423 K
22. 303 K
23. 371 K
24. T
25. T
26. Anomers
27. Pyran
28. D. dextrorotatory
29. D. laevorotatory
30. Furan
31. T
32. T

• DISACCHARIDES

33. α-D-(+)-Glucose + β-D-(-)-Fructose
34. C1 of α-D-glucose and C2 of β-D-fructose
35. T
36. Dextrorotatory
37. Laevorotatory
38. Sucrose
39. α-form
40. C1 of one α-D-Glucose to C4 of other α-D-Glucose
41. Reducing
42. Lactose
43. β-D-Glucose and β-D-Galactose
44. C1 of galactose and C4 of glucose

• POLYSACCHARIDES

45. Starch
46. Amylose and amylopectin
47. 15-20 %
48. 80-85%
49. C1-C6
50. Cellulose
51. β-D-glucose
52. Glycogen
53. T
54. T

• PROTEINS

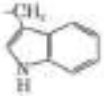
55. Protein

56. F

57. Sweet taste

58. Cheese

59.

Name of the amino acids	Characteristic feature of side chain, R	Three letter symbol	One letter code
1. Glycine	H	Gly	G
2. Alanine	$-CH_3$	Ala	A
3. Valine*	$(H_3C)_2CH-$	Val	V
4. Leucine*	$(H_3C)_2CH-CH_2-$	Leu	L
5. Isoleucine*	$H_3C-CH_2-CH(CH_3)-$	Ile	I
6. Arginine*	$HN=C(NH_2)-NH-(CH_2)_3-$	Arg	R
7. Lysine*	$H_2N-(CH_2)_4-$	Lys	K
8. Glutamic acid	$HOOC-CH_2-CH_2-$	Glu	E
9. Aspartic acid	$HOOC-CH_2-$	Asp	D
10. Glutamine	$H_2N-C(=O)-CH_2-CH_2-$	Gln	Q
11. Asparagine	$H_2N-C(=O)-CH_2-$	Asn	N
12. Threonine*	$H_3C-CHOH-$	Thr	T
13. Serine	$HO-CH_2-$	Ser	S
14. Cysteine	$HS-CH_2-$	Cys	C
15. Methionine*	$H_3C-S-CH_2-CH_2-$	Met	M
16. Phenylalanine*	$C_6H_5-CH_2-$	Phe	F
17. Tyrosine	$(p)HO-C_6H_4-CH_2-$	Tyr	Y
18. Tryptophan*		Trp	W
19. Histidine*		His	H
20. Proline		Pro	P

60. histidine, isoleucine, leucine, lysine, arginine, methionine, phenylalanine, threonine, tryptophan, and valine
61. Lysine, Arginine
62. Glutamic acid, Aspartic acid
63. T
64. Glycine
65. L
66. Left
67. Glycylalanine
68. 51
69. Fibrous and globular
70. Keratin and myosin
71. Hair, wool, silk
72. Insulin and albumin
73. α-helix and β-pleated sheets
74. Fibrous and Globular
75. Protein found in a biological system with a unique three-dimensional structure and biological activity is called a native protein
76. T
77. Globular

• VITAMINS & NUCLEIC ACIDS

78. organic compounds required in the diet in small amounts to perform specific biological functions for normal maintenance of optimum growth and health of organism
79. A, D, E, K
80. B-complex and C
81. B12

82.
83.
84.
85.
86.
87.
88.
89.
90.

Sl. No.	Name of Vitamins	Sources	Deficiency diseases
1.	Vitamin A	Fish liver oil, carrots, butter and milk	Xerophthalmia (hardening of cornea of eye) Night blindness
2.	Vitamin B_1 (Thiamine)	Yeast, milk, green vegetables and cereals	Beri beri (loss of appetite, retarded growth)
3.	Vitamin B_2 (Riboflavin)	Milk, eggwhite, liver, kidney	Cheilosis (fissuring at corners of mouth and lips), digestive disorders and burning sensation of the skin.
4.	Vitamin B_6 (Pyridoxine)	Yeast, milk, egg yolk, cereals and grams	Convulsions
5.	Vitamin B_{12}	Meat, fish, egg and curd	Pernicious anaemia (RBC deficient in haemoglobin)
6.	Vitamin C (Ascorbic acid)	Citrus fruits, amla and green leafy vegetables	Scurvy (bleeding gums)
7.	Vitamin D	Exposure to sunlight, fish and egg yolk	Rickets (bone deformities in children) and osteomalacia (soft bones and joint pain in adults)
8.	Vitamin E	Vegetable oils like wheat germ oil, sunflower oil, etc.	Increased fragility of RBCs and muscular weakness
9.	Vitamin K	Green leafy vegetables	Increased blood clotting time

91. β-D-2-deoxyribose
92. β-D-ribose
93. Adenine, Guanine, Thymine and Cytosine
94. Adenine, Guanine, Uracil and Cytosine
95. 1'
96. 5'
97. 3'
98. James Watson & Francis Crick
99. Thymine, Guanine
100. messenger RNA (m-RNA), ribosomal RNA (r-RNA) and transfer RNA (t-RNA)
101. Addison disease
102. hypoglycemia, weakness and increased susceptibility to stress
103. Oxidoreductase

Chapter 9
POLYMERS

CLASSIFICATION OF POLYMERS

1. "Based on source", polymers are classified as - (3)
2. Natural polymers ex. - (5)
3. Semi-synthetic polymers ex. - (2)
4. Cellulose acetate is also called -
5. "Based on structure", polymers classified as - (3)
6. Cross-linked polymer also called -
7. PVC is an ex. of linear/branched/network polymers.
8. Linear polymers ex - (2)
9. Branched-chain polymers ex - (1)
10. Cross-linked polymers ex - (2) (NEET)
11. _____ polymers are usually formed from bi-functional and tri-functional monomers. (NEET)
12. "Based on Mode of Polymerisation", polymers are classified as - (2)
13. Homopolymers ex - (1)
14. Copolymers ex - (2)
15. Monomers in Buna-S are - (NEET)
16. Monomers in Buna-N are -
17. Condensation polymers ex - (3)
18. Terylene is also called -
19. "Based on Molecular Forces", polymers are classified as - (4)
20. Elastomers are held together by weak/strong intermolecular forces.
21. Elastomers ex - (3)
22. Fibers possess high tensile strength and high modulus. T/F
23. Fibers have strong intermolecular forces. T/F
24. Ex. of intermolecular forces present in fibers are -
25. Fibers ex - (2)
26. Thermoplastic possess intermolecular forces of attraction intermediate between elastomers and fibres. T/F
27. Thermoplastic polymers ex - (3)
28. Thermosetting polymers are slightly branched. T/F
29. Thermosetting polymers can be reused. T/F
30. Thermosetting polymers ex - (2)
31. "Based on Growth Polymerisation", polymers are classified as - (2)
32. Chain growth polymers are actually condensation polymers. T/F

TYPES OF POLYMERISATION REACTIONS

ADDITION POLYMERISATION

33. Chain growth polymerisation is the most common mode of formation of polymers. T/F
34. Ex. of free radical generating initiator - (3)
35. LDP full form -
36. LDP is made under pressure of _____ to _____ atm at a temperature of _____- _____ K in the presence of traces of _____ or _____
37. LDP have very little branching. T/F
38. LDP is used to manufacture - (3)
39. Catalyst used to make HDP is -
40. Ziegler-Natta catalyst consist of - (2)
41. Pressure used to make HDP is less as compared to pressure used to make LDP. T/F
42. Pressure used to make HDP is __-__ atm and temp is _____ -_____ K
43. HDP have linear molecules. T/F
44. HDP is chemically inert and more tough and hard. T/F
45. HDP is used to manufacture - (3)
46. Monomer of teflon is - (NEET)
47. Tetrafluoroethene is heated with _____ or _____ catalyst to form teflon.
48. _____ is used for non-stick surface coated utensils. (NEET)
49. Acrylonitrile formula -
50. Polyacrylonitrile is used as a substitute for _____ (NEET)
51. Polyacrylonitrile is used to make fibers like _____ or _____

CONDENSATION POLYMERISATION

52. Polyamides ex - (2) (NEET)
53. Nylon 6,6 monomers - (2) (NEET)
54. Adipic acid formula -
55. Nylon 6,6 is used in making - (2)
56. Nylon 6 monomer - (NEET)
57. Nylon 6 is used in making - (3)
58. Polyesters ex - (1) (NEET)
59. Monomers used in terylene - (2) (NEET)
60. Dacron is obtained by heating the monomers at ____-____ K in the presence of _____ catalyst.
61. Dacron fibre is crease resistant. T/F
62. It is used as glass reinforcing material in safety helmets. T/F

ANSWERS 1 ANSWERS 2

63. Novolac monomers are - (2)
64. Novolac is used in _____
65. Novolac on heating with formaldehyde undergo cross linking to form _____ (NEET)
66. Electrical switches are made of -
67. Unbreakable crockery is manufactured by -

COPOLYMERISATION & RUBBER

68. Buna-S is used to manufacture - (4)
69. Rubber latex is colloidal dispersion of _____ in _____
70. Natural rubber is linear polymer of _____ (NEET)
71. Cis/trans isoprene is present in natural polymer. (NEET)
72. Natural polymer is chemically called - (NEET)
73. Cis-polyisoprene chains are held together by _____ interactions.
74. Vulcanisation of rubber is done by heating rubber with ___ at temp between _____-_____ K.
75. Rubber gets stiffened on vulcanisation. T/F (NEET)
76. In manufacture of tyre rubber, ___% of sulphur is used
77. Synthetic rubber ex - (2)
78. Neoprene monomer is - (NEET)
79. _____ is used to manufacture conveyor belts, gaskets and hoses
80. _____ is used in making oil seals, tank lining

BIODEGRADABLE POLYMERS & COMMERCIALLY IMPORTANT POLYMERS

81. Ex of biodegradable polymers - (2) (NEET)
82. PHBV full form -
83. PHBV monomers - (2)
84. 'Buta' means 4 and 'Valler' means -
85. 'Capro' means -
86. Nylon 2-nylon 6 monomers - (2)
87. _____ is used in specialty packaging, orthopaedic devices and in controlled release of drugs
88. Glyptal monomers

DIGAQS

Diga01. Melamine Structure
Diga02. Chloroprene Structure

ANSWERS

• CLASSIFICATION OF POLYMERS

1. Natural, semi-synthetic, synthetic
2. Proteins, cellulose, starch, some resins and rubber
3. cellulose acetate and cellulose nitrate
4. Rayon
5. Linear, Branched, Cross-linked
6. Network polymers
7. Linear
8. Polythene, PVC
9. LDP (low density polythene)
10. Bakelite, melamine
11. Cross linked
12. Addition, condensation
13. Polythene
14. Buna-S, Buna-N
15. 1,3-Butadiene + Styrene
16. 1,3-Butadiene + Acrylonitrile
17. Terylene, nylon 6, 6, nylon 6
18. Dacron
19. Elastomers, fibers, thermoplastic polymers, thermosetting polymers
20. Weak
21. Buna-S, Buna-N, neoprene
22. T
23. T
24. Hydrogen bonding
25. Terylene, nylon 6,6
26. T
27. Polythene, polystyrene, polyvinyls
28. F
29. F
30. Bakelite, urea-formaldehyde resins
31. Chain growth polymers and step growth polymers
32. F

• ADDITION POLYMERISATION

33. T
34. benzoyl peroxide, acetyl peroxide, tert-butyl peroxide
35. Low density polythene
36. 1000 to 2000 atm, 350-570 K, dioxygen or a peroxide initiator
37. F
38. squeeze bottles, toys and flexible pipes
39. Ziegler-Natta catalyst
40. $TiCl_4$, $AlC_2H_5Cl_2$
41. T
42. 6-7 atm, 333-343 K
43. T
44. T
45. buckets, dustbins, bottles, pipes
46. Tetrafluoroethene
47. Free radical or persulfate catalyst
48. Teflon
49. $CH_2{=}CHCN$
50. Peroxide catalyst
51. Orlon or acrilan

• CONDENSATION POLYMERISATION

52. Nylon 6 & Nylon 6,6
53. Hexamethylenediamine and adipic acid
54. $HOOC-(CH_2)_4-COOH$
55. Sheets, bristles for brushes
56. Caprolactam
57. Type cords, fabrics and ropes
58. Terylene
59. ethylene glycol and terephthalic acid

60. 420-460 K, zinc acetate-antimony trioxide catalyst
61. T
62. T
63. Phenol and formaldehyde
64. Paints
65. Bakelite
66. Bakelite
67. Melamine-formaldehyde polymer

• COPOLYMERISATION & RUBBERS

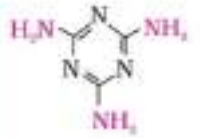
68. autotyres, floor tiles, footwear components, cable insulation
69. Rubber in water
70. Isoprene
71. C_5
72. cis-1,4-polyisoprene
73. van der Waals
74. S, 373-415 K
75. T
76. 5%
77. Neoprene, Buna-S
78. Chloroprene
79. Neoprene
80. Buna-N

• BIODEGRADABLE POLYMERS & COMMERCIALLY IMPORTANT POLYMERS

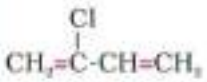
81. PHBV, Nylon 2-nylon 6
82. Poly β-hydroxybutyrate – co-β-hydroxy valerate
83. 3-Hydroxybutanoic acid + 3-Hydroxypentanoic acid
84. 5
85. 6
86. Glycine + amino caproic acid
87. PHBV
88. Ethylene glycol + Phthalic acid

• DIGAQS

Digaq 1.



Digaq 2.



Chapter 10
CHEMISTRY IN EVERYDAY LIFE

DRUG AND ITS CLASSIFICATION

1. Drugs are chemicals of high molecular masses. T/F
2. Analgesics have _____ effect.
3. Antiseptics have _____ effect.
4. Most useful classification for medicinal chemists is on the basis of _____
5. The body degrades the enzyme-inhibitor complex and synthesises the new enzyme. T/F
6. Drugs that inhibit the natural function at the receptor site are called -
7. Drugs that mimic the natural messenger by switching on the receptor are called

THERAPEUTIC ACTION OF DIFFERENT CLASSES OF DRUGS

ANTACIDS & ANTIHISTAMINES

8. Excess hydrogencarbonate can make the stomach alkaline and trigger the production of even more acid. T/F
9. _____ prevents the interaction of histamine with the receptors present in the stomach wall.
10. Tagamet is -
11. Ranitidine is also called -
12. Histamine is a vasoconstrictor/vasodilator.
13. Antihistamine drugs ex - (2)

NEUROLOGICALLY ACTIVE DRUGS

14. Tranquilizers are used for treatment of -
15. Tranquilizers ex - (2) (NEET)
16. Antidepressant drugs ex - (2)
17. What does antidepressant do ?
18. _____ is a tranquilizer used in controlling depression and hypertension.
19. Derivative of barbituric acid ex - (5) (NEET)
20. Barbiturates are not hypnotic. T/F
21. Barbiturates are also a type of tranquilizer. T/F (NEET)
22. Valium and serotonin are also used as tranquilizers. T/F
23. 2 types of Analgesics are - (2)
24. Non-narcotic analgesics ex - (2) (NEET)

25. Aspirin inhibit synthesis of -
26. Prostaglandins stimulate _____ in tissue
27. Aspirin is used in the prevention of heart attacks. T/F
28. Narcotic analgesics ex. - (3)
29. Morphine narcotics are obtained from -
30. Narcotic analgesics are used to relieve pain in - (4)

ANTIMICROBIALS

31. Paul Ehrlich was a British/German Bacteriologist/Mycologist
32. _____ was discovered by Paul Ehrlich as a treatment of syphilis
33. _____ was known as salvarsan
34. _____ caused syphilis
35. First effective antibacterial agent prepared by Ehrlich was -
36. Prontosil is converted in the body into _____ which is the actual active component
37. Most effective sulpha drug is -
38. Bactericidal antibiotics ex - (3)
39. Bacteriostatic antibiotics ex - (3)
40. Broad spectrum antibiotic means -
41. Narrow spectrum antibiotics means -
42. Limited spectrum antibiotics means -
43. Narrow spectrum antibiotic ex - (1) (NEET)
44. Synthetic modification of penicillin are - (2) (NEET)
45. Ampicillin and Amoxycillin are broad/narrow spectrum
46. Penicillin is manufactured in India at --
47. Chloramphenicol is a broad/narrow spectrum antibiotic (NEET)
48. Chloramphenicol is rapidly absorbed from the gastrointestinal tract T/F
49. Name 2 imp. broad spectrum antibiotics -
50. _____ is an antibiotic supposed to be toxic towards certain strains of cancer
51. Antiseptics ex - (2)
52. Dettol is a mixture of - (2) (NEET)
53. _____ is added to soap to impart antiseptic properties (NEET)
54. Iodine is a powerful antiseptic. T/F
55. Iodine 2-3 % solution in alcohol water mixture is known as -
56. CHCl3 is also used as an antiseptic for wounds. T/F
57. _____ in dilute aqueous solution is weak/strong antiseptic for eyes (NEET)
58. Some substances can act as an antiseptic as well as disinfectant by varying the concentration. T/F (NEET)

59. ___ % sol. of phenol is antiseptic and ___% sol. of phenol is disinfectant. (NEET)
60. Disinfectant ex - (2) (NEET)

ANTIFERTILITY DRUGS

61. Birth control pills essentially contain a mixture of - (2)
62. Progesterone suppresses ovulation. T/F
63. Synthetic progesterone derivatives are more potent than progesterone. T/F
64. Most widely used synthetic progesterone -
65. Synthetic estrogen ex - (1)

CHEMICALS IN FOOD

66. Name all the artificial sweeteners given in NCERT - (4)
67. Tell the sweetness value of each in comparison to cane sugar.
68. _____ is the first popular artificial sweetening agent.
69. _____ is the most successful and widely used artificial sweetener.
70. Aspartame is unstable at cooking temperature. T/F (NEET)
71. Saccharin is harmful to the body. T/F
72. Alitame is more stable than aspartame. T/F
73. _____ is trichloro derivative of sucrose.
74. _____is stable at cooking temperature and it doesn't provide calories. (NEET)
75. Name some substances used as preservatives - (6)
76. Antioxidants ex - (2)

CLEANING AGENTS

77. Glycerine is chemically -
78. Name the types of soaps - (5)
79. Only Na and K soaps are soluble in water and are used. T/F
80. Generally Na soaps are soft to the skin than K soaps T/F
81. Transparent soaps are made by dissolving in _____
82. Shaving soaps contain _____ to prevent rapid drying
83. _____ a gum, is added while making shaving soaps
84. Laundary soap contains fillers like - (4)
85. Soap powders and scouring soap contains -
86. Builder ex - (2)
87. Builders make soap act less rapidly. T/F

88. Detergents given foam even in hard water. T/F
89. Name the classes of detergents - (3)
90. Anionic detergents ex - (2)
91. Anionic detergents are used in toothpaste. T/F
92. Cation detergent ex - (1) (NEET)
93. Cetyltrimethylammonium bromide is used in -
94. Liquid dishwashing detergent is a cationic detergent. T/F
95. Cationic detergents have germicidal properties and are expensive. T/F
96. Steric acid + Polyethyleneglycol form anionic/cationic/non-ionic detergent.
97. If hydrocarbon chain of detergent is highly branched, then bacteria can degrade it very easily. T/F

DIGAQS

DigaQ1. Draw sulfonamide structure
DigaQ2. Draw sodium lauryl sulphate structure
DigaQ3. Draw sodium dodecylbenzene sulfonate structure
DigaQ4. Draw cetyltrimethylammonium bromide structure. (NEET)

ANSWERS

• DRUGS AND ITS CLASSIFICATION

1. F
2. Pain killing
3. Kill or arrest the growth of microorganisms
4. 'Molecular targets'
5. T
6. Antagonist
7. Agonist

• ANTACIDS & ANTIHISTAMINES

8. T
9. Cimetidine
10. Cimetidine
11. Zantac
12. vasodilator
13. Brompheniramine (Dimetapp) and terfenadine (Seldane)

• NEUROLOGICALLY ACTIVE DRUGS

14. Stress and mild or severe mental disease
15. Chlordiazepoxide and meprobamate
16. Iproniazid, phenelzine
17. These drugs inhibit the enzymes which catalyse the degradation of noradrenaline
18. Equanil
19. veronal, amytal, nembutal, luminal and seconal
20. F
21. T
22. T
23. Narcotic and non-narcotic
24. Aspirin and paracetamol
25. Prostaglandins
26. Inflammation
27. T
28. Morphine, heroin, codeine
29. Opium poppy
30. postoperative pain, cardiac pain, pains of terminal cancer, and in child birth

• ANTIMICROBIALS

31. German bacteriologist
32. Salvarsan
33. Arsphenamine
34. Spirochete
35. Salvarsan
36. Sulphanilamide
37. Sulphapyridine
38. I. Penicillin
II. Aminoglycosides
III. Ofloxacin
39. I. Erythromycin
II. Tetracycline
III. Chloramphenicol
40. kill or inhibit a wide range of Gram-positive and Gram-negative bacteria
41. effective mainly against any one group (Gram-positive or Gram-negative)
42. effective against a single organism or disease
43. Penicillin G
44. Ampicillin and amoxycillin
45. Broad
46. Hindustan Antibiotics in Pimpari and in private sector
47. Broad
48. T
49. Vancomycins nd ofloxacin
50. Dysidazirine
51. furacine, soframycine
52. chloroxylenol and terpineol
53. Bithional
54. T
55. Tincture of iodine

56. T
57. Boric acid, weak
58. T
59. 0.2%, 1%
60. Cl in conc. of 0.2-0.4 ppm, SO2 in very low conc.

• ANTIFERTILITY DRUGS

61. Synthetic estrogen and progesterone
62. T
63. T
64. Norethindrone
65. Ethynylestradiol (norestrol)

• CHEMICALS IN FOOD

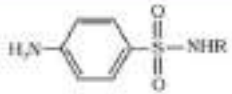
66. Aspartame, Saccharin, Sucralose, Alitame
67. Aspartame - 100
Saccharin - 550
Sucralose - 600
Alitame - 2000
68. Saccharin
69. Aspartame
70. T
71. F
72. T
73. Sucralose
74. Sucralose
75. Salt, Sugar; Vegetable oils, sodium benzoate, sorbic acid, propanoic acid
76. BHT (Butylated hydroxy toluene) , BHA (Butylated Hydroxy Anicole)

• CLEANING AGENTS

77. Glycerol
78. Toilet soaps, Transparent soaps, medicated soaps, shaving soaps, laundary soaps
79. T
80. F
81. Ethanol
82. glycerol
83. Rosin
84. sodium resinate, sodium silicate, borax and sodium carbonate.
85. Scouring agent (like powdered pumice or finely divided sand) and builders
86. Na2CO3 and Na3PO4
87. F
88. T
89. Anionic, cationic and non-ionic
90. Sodium laurylsluphate, sodium dodecylbenzenesulphonate
91. T
92. Cetyltrimethylammonium bromide
93. Hair conditioners
94. F, non-ionic
95. T
96. Non-ionic
97. F

• DIGAQS

Digaq 1.



Digaq 2.

Digaq 3.

Digaq 4