THE REFERENCE MATERIALS IN BIOORGANIC CHEMISTRY

for 1-st year students of Overseas Student Training Faculty on a specialty “Stomatology”

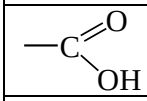
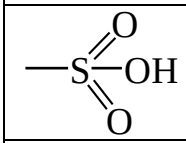
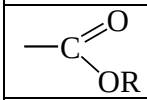
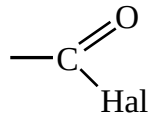
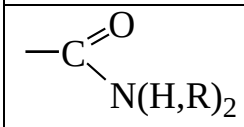
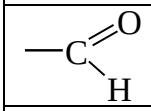
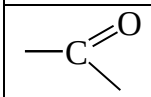
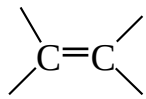
1. THE IUPAC SYSTEM FOR NAMING OF ALKANES

Number of carbon atoms	Structure	Name	Number of carbon atoms	Structure	Name
C_1	CH_4	Methane	C_{17}	$H_3C-(CH_2)_{15}-CH_3$	Heptadecane
C_2	H_3C-CH_3	Ethane	C_{18}	$H_3C-(CH_2)_{16}-CH_3$	Octadecane
C_3	$H_3C-CH_2-CH_3$	Propane	C_{19}	$H_3C-(CH_2)_{17}-CH_3$	Nonadecane
C_4	$H_3C-(CH_2)_2-CH_3$	Butane	C_{20}	$H_3C-(CH_2)_{18}-CH_3$	Eicosane
C_5	$H_3C-(CH_2)_3-CH_3$	Pentane	C_{21}	$H_3C-(CH_2)_{19}-CH_3$	Heneicosane
C_6	$H_3C-(CH_2)_4-CH_3$	Hexane	C_{22}	$H_3C-(CH_2)_{20}-CH_3$	Docosane
C_7	$H_3C-(CH_2)_5-CH_3$	Heptane	C_{23}	$H_3C-(CH_2)_{21}-CH_3$	Tricosane
C_8	$H_3C-(CH_2)_6-CH_3$	Octane	C_{30}	$H_3C-(CH_2)_{28}-CH_3$	Triacontane
C_9	$H_3C-(CH_2)_7-CH_3$	Nonane	C_{31}	$H_3C-(CH_2)_{29}-CH_3$	Hentriacontane
C_{10}	$H_3C-(CH_2)_8-CH_3$	Decane	C_{40}	$H_3C-(CH_2)_{38}-CH_3$	Tetracontane
C_{11}	$H_3C-(CH_2)_9-CH_3$	Undecane	C_{50}	$H_3C-(CH_2)_{48}-CH_3$	Pentacontane
C_{12}	$H_3C-(CH_2)_{10}-CH_3$	Dodecane	C_{60}	$H_3C-(CH_2)_{58}-CH_3$	Hexacontane
C_{13}	$H_3C-(CH_2)_{11}-CH_3$	Tridecane	C_{70}	$H_3C-(CH_2)_{68}-CH_3$	Heptacontane
C_{14}	$H_3C-(CH_2)_{12}-CH_3$	Tetradecane	C_{80}	$H_3C-(CH_2)_{78}-CH_3$	Octacontane
C_{15}	$H_3C-(CH_2)_{13}-CH_3$	Pentadecane	C_{90}	$H_3C-(CH_2)_{88}-CH_3$	Nonacontane
C_{16}	$H_3C-(CH_2)_{14}-CH_3$	Hexadecane	C_{100}	$H_3C-(CH_2)_{98}-CH_3$	Hectane

2. ALKYL GROUPS

Alkane	Alkyl group	Name/Abbreviation
CH_4 Methane	CH_3 -	Methyl-/Me-
H_3C-CH_3 Ethane	H_3C-CH_2-	Ethyl-/Et-
H_3C-CH_2-CH_3 Propane	H_3C-CH_2-CH_2- $H_3C-CH(CH_3)-$	Propyl-/Pr Isopropyl-/*i*-Pr-
H_3C-CH_2-CH_3-CH_4 Butane	H_3C-CH_2-CH_3-CH_3- $H_3C-CH_2-CH(CH_3)-$	*n*-Butyl-/*n*-Bu- *secondary*-Butyl-/*sec*-Bu-
$H_3C-C(CH_3)_2-CH_3$	$H_3C-CH(CH_3)-CH_2-$ $H_3C-C(CH_3)_2-$	Isobutyl-/*i*-Bu- *Tertiary*-Butyl-/*tert*-Bu-

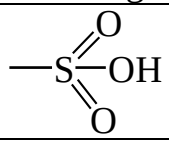
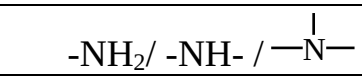
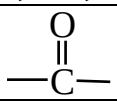
3. FUNCTIONAL GROUPS PRIORITY RANGE. (the order of priority of functional groups decreases from top to bottom)

Functional group	Prefix	Suffix
	Carboxy-	-oic acid -carboxylic acid
	Sulfo-	-sulfonic acid
	R-oxycarbonyl-	-oate -carboxylate
	Halocarbonyl-	-oyl halide -carbonyl halide
	Carbomoyl-	-amide -carboxamide
–C≡N	Cyano-	-nitrile -carbonitrile
	Formyl-	-al -carbaldehyde
	Oxo-	-one
–OH	Hydroxy-	-ol
–SH	Mercapto-	-thiol
–N(H,R)$_2$	Amino-	-amin
	Alkenyl-	-ene
—C≡C—	Alkynyl-	-yne

Functional groups work as prefixes

Functional group	Prefix name
-Halogens (-F,-Cl,-Br,-I)	Halo-(fluoro-, chloro-, bromo-, iodo-)
-OR	Alkoxy-
-SR	Alkylthio-
-NO$_2$	Nitro-
-N=O	Nitroso-

4. RADICOFUNCTIONAL NOMENCLATURE
Functional groups work as suffixes

Functional group	Suffix
	Sulfonic acid
-OH	alcohol
-SH	thioalcohol
	amine
-O-	ether
Hal (-F, -Cl, -Br, -I)	halide
	ketone
	cyanide

5. ELECTRONEGATIVITIES OF SOME OF THE ELEMENTS

H 2.1						
Li 1.0	**Be** 1.5	**B** 2.0	**C** 2.5	**N** 3.0	**O** 3.5	**F** 4.0
Na 0.9	**Mg** 1.2	**Al** 1.5	**Si** 1.8	**P** 2.1	**S** 2.5	**Cl** 3.0
K 0.8						**Br** 2.8

6. VALENCE STATE OF CARBON ATOM

The electronic structure of the valence shell			The scheme of valence orbitals The configuration of an atom	The configuration of a molecule	The number and type of covalent bonds.	The sign in the structural formula	Examples
Without hybridization	Involving hybridization type						
C 2 ↑ p_x p_y p_z 2s 2p	sp^3	sp^3	tetrahedral	tetrahedral	4σ-bonds	—C—	CH_4 methane CH_3-CH_3 ethane CH_3-CH_2-CH_3 propane
	sp^2	sp^2 p_z	trihedral	Trigonal planar (coplanar)	3σ-bonds and 1π-bond	=C<	ethene isoprene
	sp	sp p_y p_z	dihedral	Colinear	2σ-bonds and 2π-bonds	≡C—	H—C≡C—H ethyne

7. VALENCE STATE OF NITROGEN ATOM

The electronic structure of the valence shell			The scheme of valence orbitals The configuration of an atom	The configuration of a molecule	The number and type of covalent bonds.	The sign in the structural formula	Examples
Without hybridization	Involving hybridization type						
N 2 ↑↓ p_x p_y p_z 2s 2p	sp^3	sp^3	tetrahedral	tetrahedral	3 σ-bonds	—N<	methylamine dimethylamine
	sp^2	Pyrrol sp^2 p_z	trihedral	Trigonal planar (coplanar)	3 σ-bonds and p,π-conjugation	—N<	N,N-dimethyl-p-toluidine pyrrol
		Pyridine sp^2 p_z	trihedral		2 σ-bonds and 1 π-bond	N	piridine
	sp	sp p_y p_z			1 σ-bond and 2 π-bonds	≡N	acrylonitrile

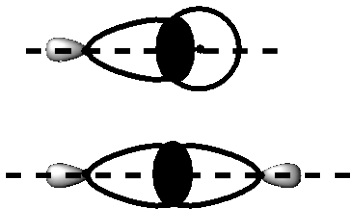
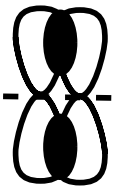
8. VALENCE STATE OF OXYGEN ATOM

The electronic structure of the valence shell			The scheme of valence orbitals The configuration of an atom	The configuration of a molecule	The number and type of covalent bonds.	The sign in the structural formula	Examples
Without hybridization	Involving hybridization type						
O 2 p_x p_y p_z 2s 2p	sp 3	sp^3	tetrahedral	tetrahedral	2 σ-bonds	—O—	$H_3C—C(H_2)—O—H$ ethanol $H_3C—O—CH_3$ dimethyl ether
	sp 2	Pyrrol sp^2 p_z	trihedral	Trigonal planar (coplanar)	2 σ-bonds and p,π-conjugation	—O—	phenol
		Pyridine sp^2 p_z	trihedral		1 σ-bond and 1 π-bond	=O	R—C(=O)—H (A_R) aldehydes R—C(=O)—R (A_R) (A_R) ketones

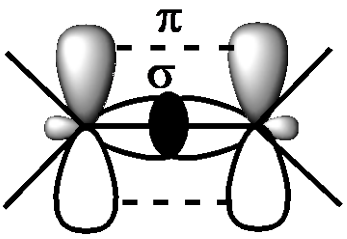
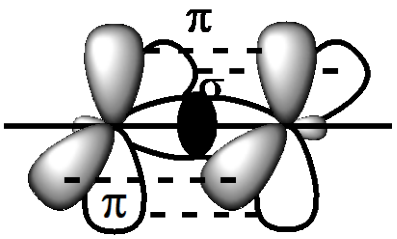
9. THE PERIODIC TABLE OF ELEMENTS (fragment)

Periods	The groups of elements			
	IV	V	VI	VII
1				1 H 2,1 / 1,0 / 1
2	6 C 2,5 / 12,1 / 4 2	7 N 3,0 / 14,01 / 5 2	8 O 3,5 / 16,0 / 6 2	9 F 4,0 / 19,0 / 7 2
3	14 Si 1,8 / 28,08 / 4 8 2	15 P 2,1 / 31,0 / 5 8 2	16 S 2,5 / 32,07 / 6 8 2	17 Cl 3,0 / 35,45 / 7 8 2
4		33 As / 75,0 / 5 18 8 2		35 Br 2,8 / 80,0 / 7 18 8 2
5	Atomic number — Atomic mass — 6 C 12,1 — 2,5 Electronegativity (on base Poling) — 4 2 The numbers of electrons on shells			53 I 2,6 / 127,0 / 7 18 18 8 2

10. ELECTRONIC STRUCTURES AND CHARACTERISTICS OF σ- AND π-BONDS

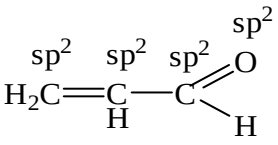
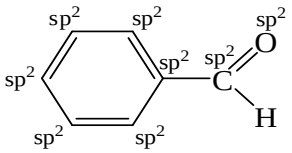
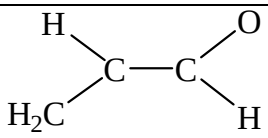
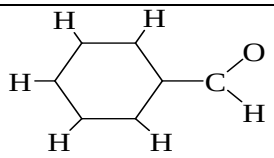
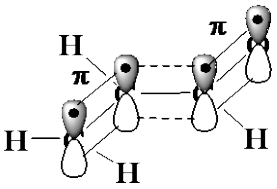
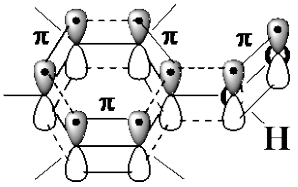
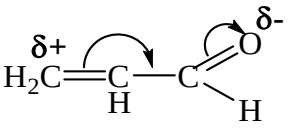
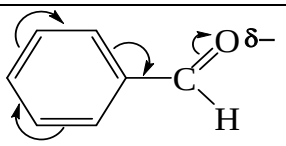
Characteristics of bond	σ-bond	π-bond
The type of atomic orbitals overlap	End-on overlap of a) sp^3 hybrid orbital and s-orbital or b) two sp^3 hybrid orbitals.	Sideways overlap of two p-orbitals.
The scheme of atomic orbitals overlap		
Bond energy (E_{bond})	$E_{\sigma\text{-bond}} > E_{\pi\text{-bond}}$	
Polarizability	Polarizability(σ) < Polarizability(π)	
Rotation around bond axis without bond breaking	It is possible.	It is not possible.

ELECTRONIC STRUCTURE OF MULTIPLE BONDS

The double vond	The triple bond
σ + π	σ + π +π
	

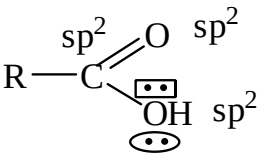
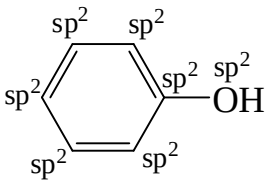
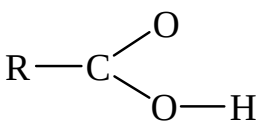
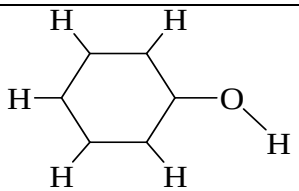
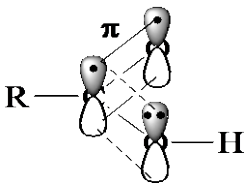
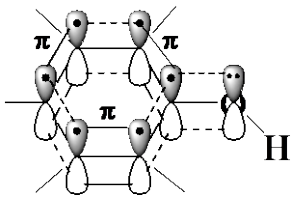
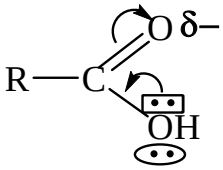
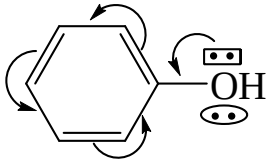
11. STRUCTURE AND CHARACTERISTICS OF CONJUGATED SYSTEMS.

π,π-conjugation

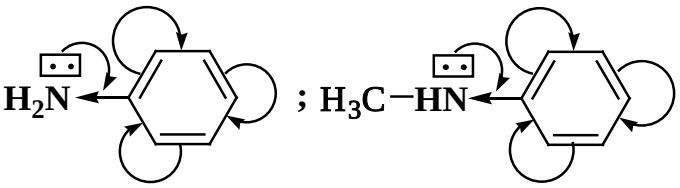
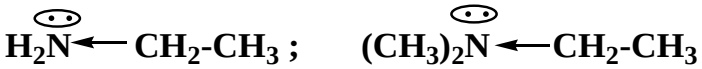
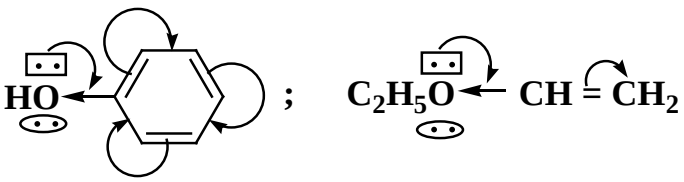
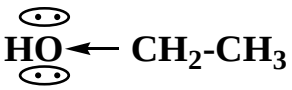
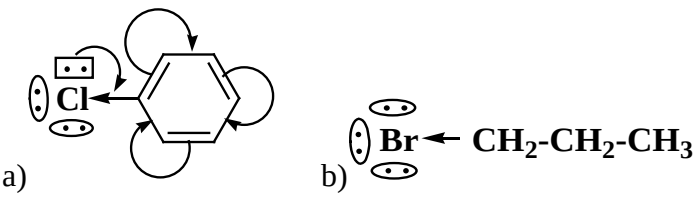
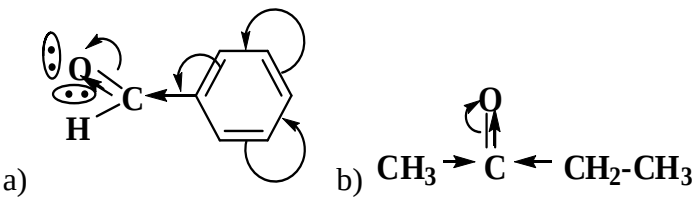
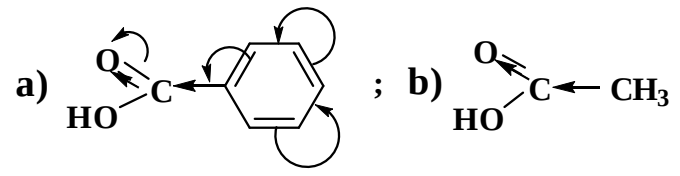
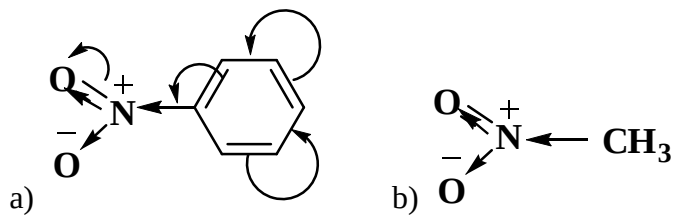
The sign in the structural formula	Peculiarities of conjugated systems' structure	Examples	
		Acrylic aldehyde	Benzaldehyde
Alternation of double and single bonds.	1)At least four carbon atoms are sp^2–hybrid.		
	2) σ–bonds skeleton is plane, coplanar.		
	3) Four p_z non-hybrid orbitals are perpendicular to the σ–bonds plane and overlap mutually.		
	4) There are π-electron density delocalization and energy liberation (E_R).		

12. STRUCTURE AND CHARACTERISTICS OF CONJUGATED SYSTEMS.

p,π-conjugation

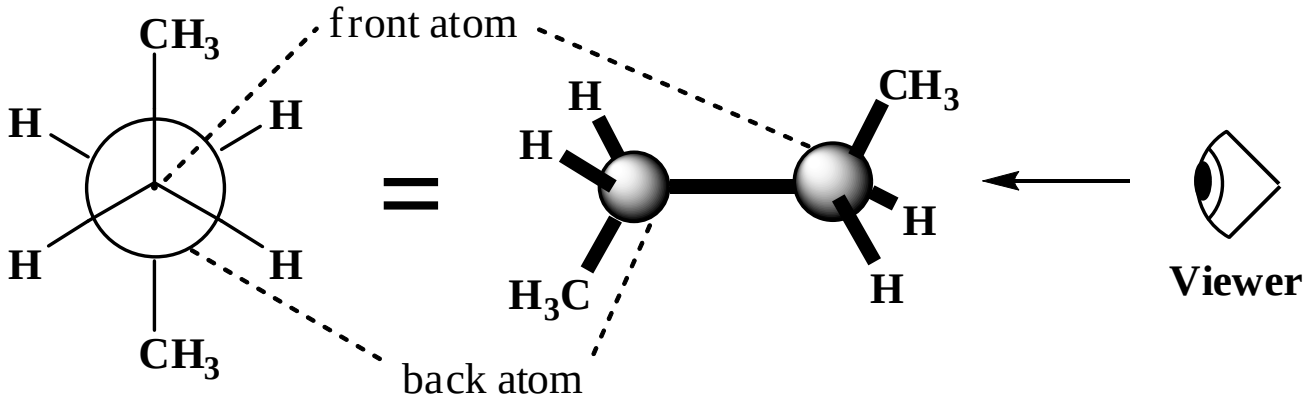
The sign in the structural formula	Peculiarities of conjugated systems' structure	Examples	
		Carboxylic acid	Phenol
Heteroatom of pyrrole type near to the sp^2–hybrid carbon atom.	1) Minimum three neighboring atoms are sp^2–hybrid.		
	2) σ–bonds skeleton is plane, coplanar.		
	3) There is mutually overlapping of p_z atomic orbitals.		
	4) There are π-electron density delocalization and energy liberation (E_R).		

13. ELECTRON EFFECTS OF SUBSTITUENTS

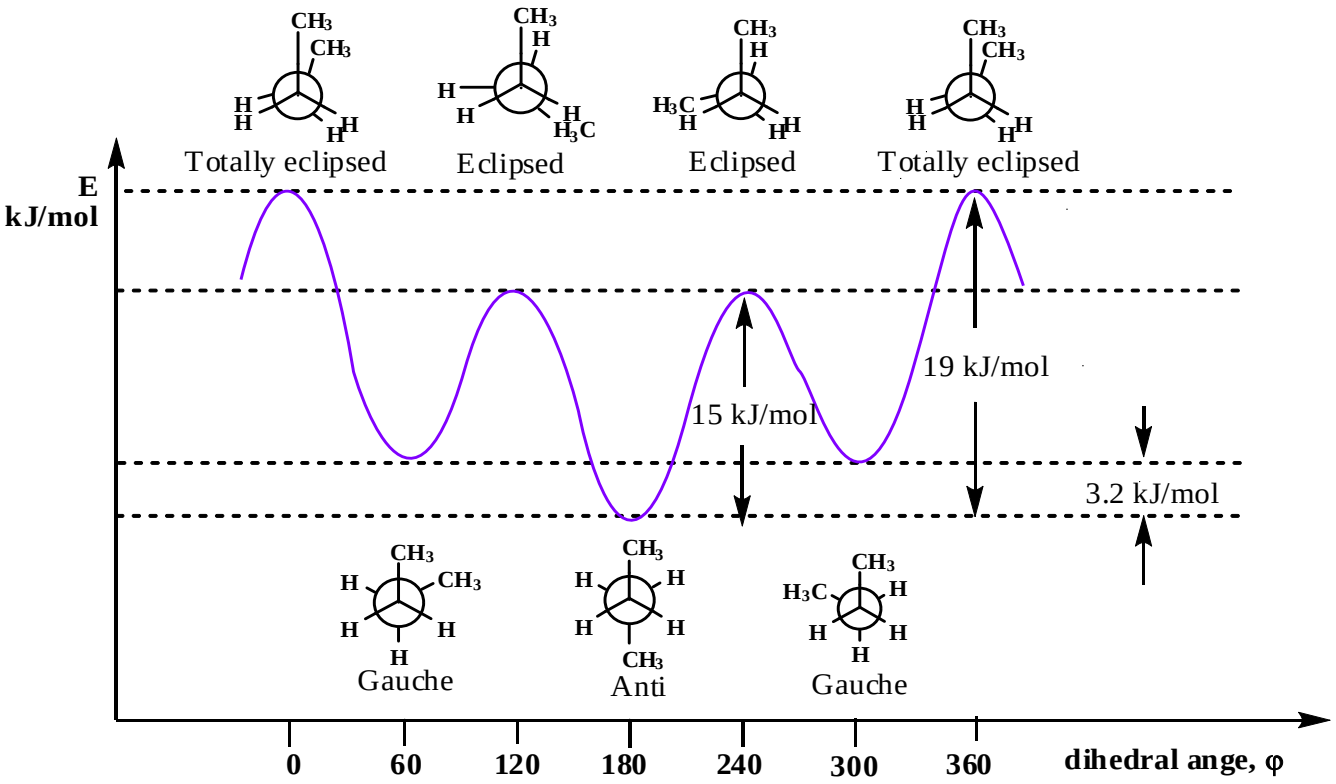
The substitu-ent	Inductive effect (I)	Resonans (mesomeric) effect (M)	Total electron effect of the substituent	Examples
- Alk (-R) $-CH_3$,$-C_2H_5$	+ I		ED	
- NH_2 (-NHR, - NR_2)	a) – I	+ M	ED (+M>- I)	
	b) - I		EA	
- OH (- OR)	a) - I	+ M	ED (+M >- I)	
	b) - I	—	EA	
Halogens: - F, - Cl, - Br, - I	a) – I b) - I	+ M —	EA (- I >+ M) EA	
>C = O	a) – I b) - I	- M —	EA EA	
- COOR (R=-H, $-OR$,$-NH_2$, -Hal, -OCOR)	a) – I b) - I	- M —	EA EA	
- NO_2	a) – I b) - I	- M —	EA EA	

14. NEWMAN PROJECTION FORMULAS.

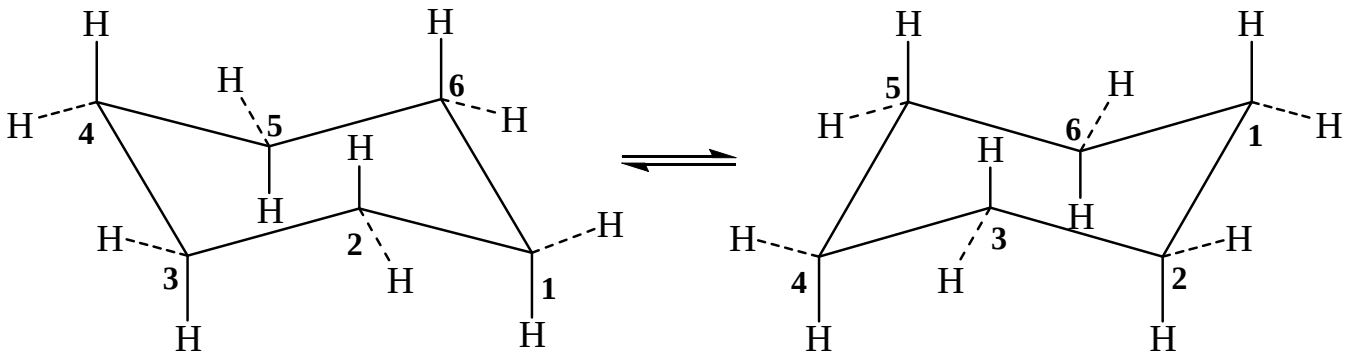
Butane $H_3C-\overset{H_2}{C}-\overset{H_2}{C}-CH_3$



15. CONFORMATIONS of BUTANE and THEIR POTENTIAL ENERGY



16. THE CHAIR CONFORMATIONS of CYCLOHEXANE. RING INVERSION.

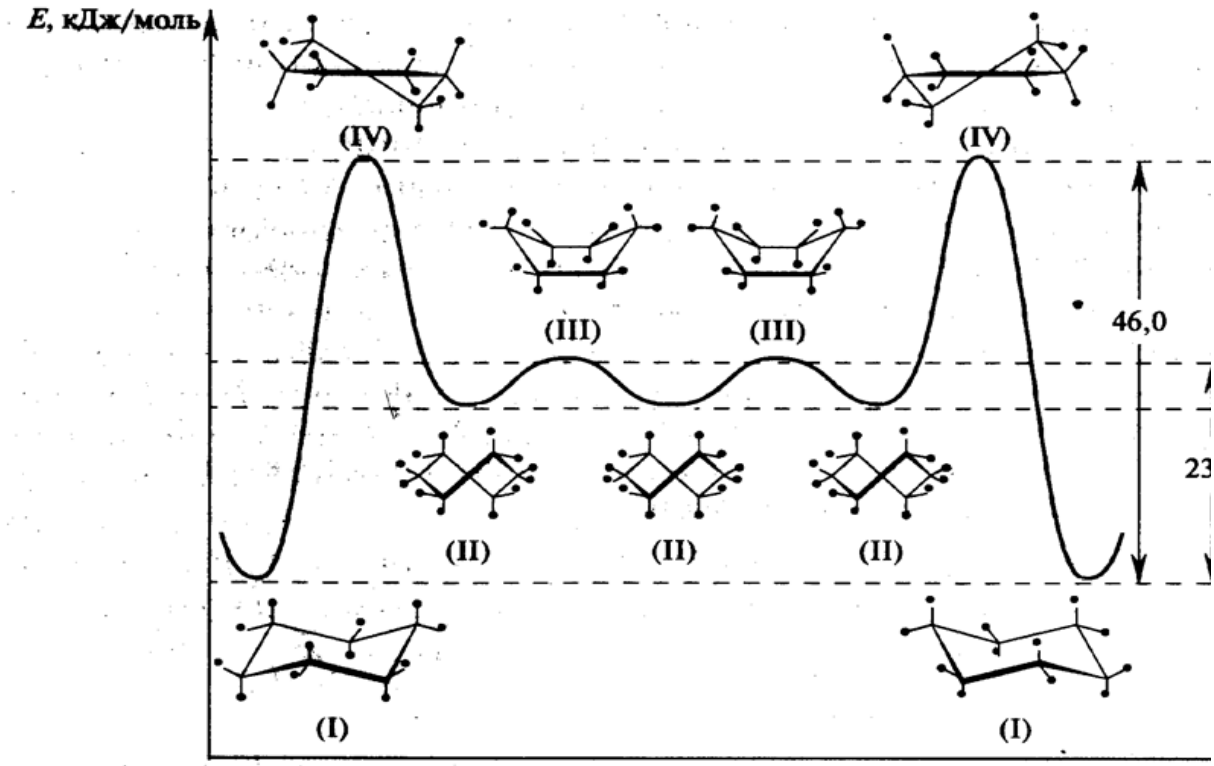


$^{4}C_{1}$ $_{4}C^{1}$

Axial bonds

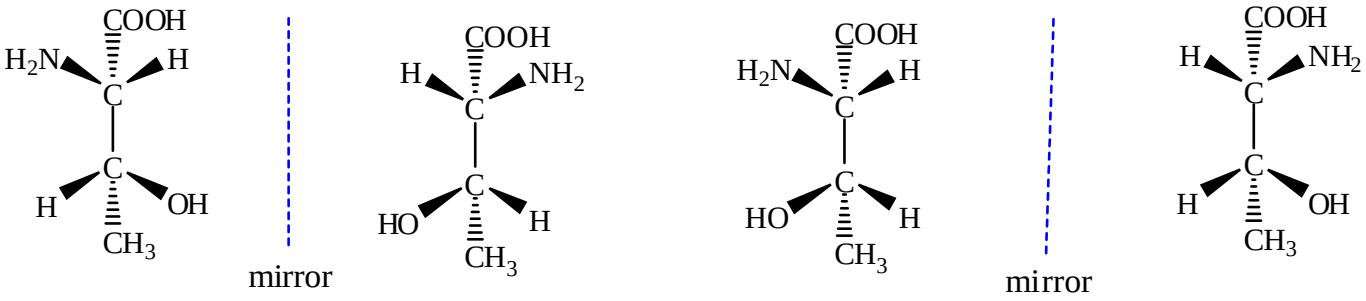
Equatorial bonds

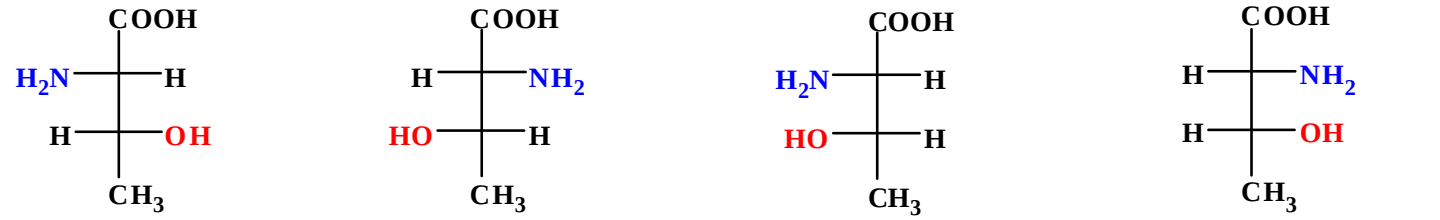
17. THE CYCLOHEXANE CONFORMATIONS THEIR POTENTIAL ENERGY.



18. ENANTIOMERS and DIOSTEREOMERS

FISCHER PROJECTION FORMULAS

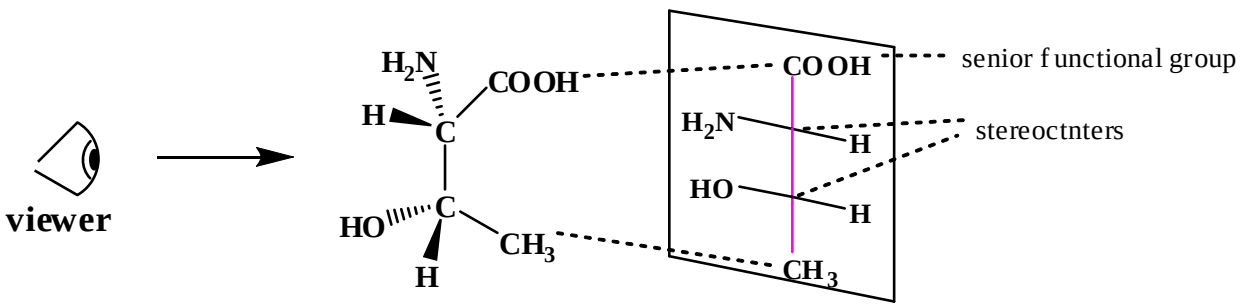




1. L-threonine, $[\alpha]_D$= -3,4° **2. D-threonine, $[\alpha]_D$= +3,4°** **3. L-all-threonine, $[\alpha]_D$=+12°** **4. D-all-threonine, $[\alpha]_D$=+12°**

Enantiomers **Enantiomers**

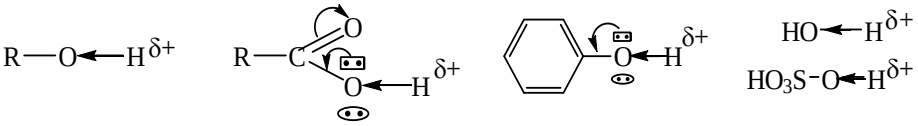
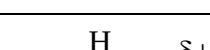
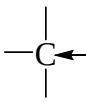
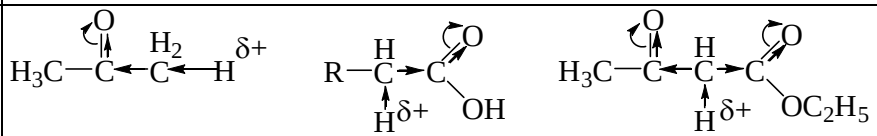
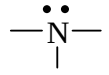
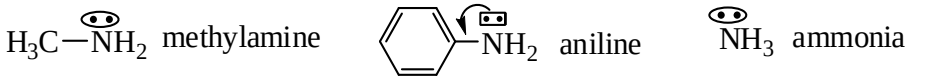
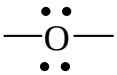
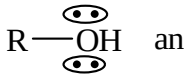
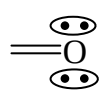
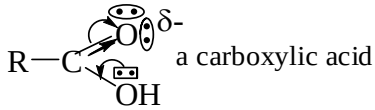
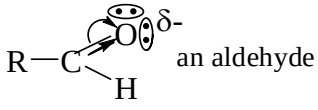
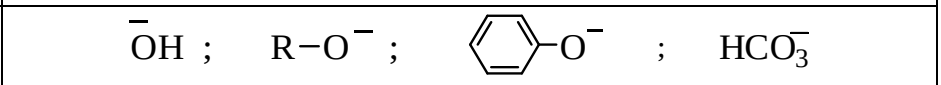
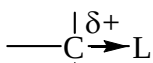
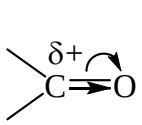
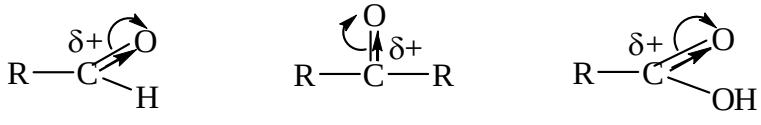
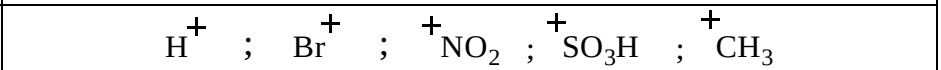
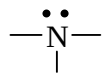
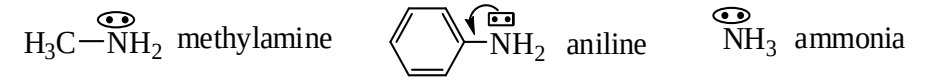
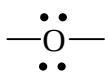
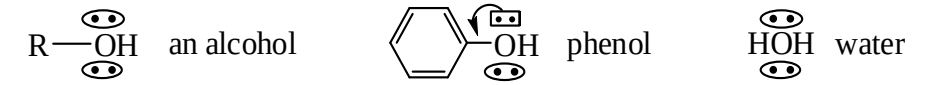
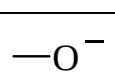
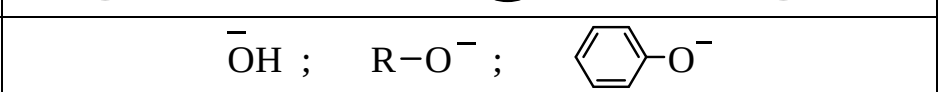
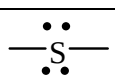
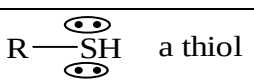
Diastereomers: 1 and 3 2 and 3 1 and 4 2 and 4



Line-dash-wedge representation

Fischer projection formula

19. REACTION CENTRES IN ORGANIC COMPOUND STRUCTURES.

The type of reaction center		The sign in the structural formula.	Examples
According to the Bronsted-Lowry theory			
Acidic	**OH**		 an alcohol a carboxylic acid phenol
	SH		 a thiol
	NH		Methylamine an amide aniline
	CH		 Acetone a carboxylic acid acetoacetic ester
n-Basic	**N**		 methylamine aniline ammonia
			 pyridine
	O		 an alcohol  water
			 a carboxylic acid  an aldehyde
			 ; ; ;
According to the Lewis theory			
Electro-philic (a Lewis acid)	**substrates**		 a halocompound an alcohol
			 An aldehyde a ketone a carboxylic acid
	reagents		 ; ; ; ;
Nucleo-philic (a Lewis base) **reagents**	**N**		 methylamine aniline ammonia
	O		 an alcohol phenol water
			 ; ;
	S		 a thiol

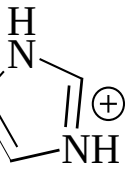
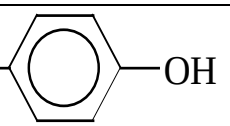
20. NOMENCLATURE OF DI- AND POLYSACCHARIDES

Name	IUPAC name
Sucrose	2-O-(α-D-glucopyranosyl)-β-D-fructofuranoside
Maltose	4-O-(α-D-glucopyranosyl)-α(β)-D-glucopyranose
Cellobiose	4-O-(β-D-glucopyranosyl)-α(β)-D- glucopyranose
Lactose	4-O-(β-D-galactopyranosyl)-α(β)-D- glucopyranose
Starch	Consist of amylose and amylopectin
a) amylose	$(\alpha\text{-D-glucopyranosyl-1,4})_n$-α(β)-D- glucopyranose
b) amylopectin	$(\alpha\text{-D-glucopyranosyl-1,4})_n$-α(β)-D-glucopyranose with branching α, 1→6
Glycogen	$(\alpha\text{-D-glucopyranosyl-1,4})_n$-α(β)-D- glucopyranose with branching α, 1→6
Cellulose	$(\beta\text{-D-glucopyranosyl-1,4})_n$-α(β)-D- glucopyranose
Chondroitin-4-sulfate	[D-glucuronic acid –β-1,3-N-acetyl-D-galactosamine-4-sulfate-β-1,4]$_n$
Heparin	[D-glucuronic acid –2-sulfate-β-1,4-N-sulfo-D-glucosamine-6-sulfate-α-1,4]$_n$
Hyaluronic acid	[D-glucuronic acid –β-1,3-N-acetyl-D-glucosamine-β-1,4]$_n$-[D-glucuronic acid-β-1,3-N-acetyl-D-glucosamine]$_m$
Alginic acid	(D-mannuronic acid β-1,4-D-guluronic acid-α-1,4), guluronic acid (C_5 epinem of mannuronic acid)

21. NOMENCLATURE OF AMINO ACIDS

Name	IUPAC name	Abbreviation
Alanine	2-aminopropanoic acid	Ala
Valine	2-amino-3-methylbutanoic acid	Val
Leucine	2-amino-4-methylpentanoic acid	Leu
Isoleucine	2-amino-3-methylpentanoic acid	Ile
Phenylalanine	2-amino-3-phenylpropanoic acid	Phe
Tryptophan	2-amino-3(indolyl-3)-propanoic acid	Trp
Methionine	2-amino-4-methylthiobutanoic acid	Met
Proline	Pyrrolidine-2-carboxylic acid	Pro
Glycine	2-aminoethanoic acid	Gly
Serine	2-amino3-hydroxypropanoic acid	Ser
Threonine	2-amino-3-hydroxybutanoic acid	Thr
Cysteine	2-amino-3-mercaptopropanoic acid	Cys
Tyrosine	2-amino-3(4-hydroxyphenyl)-propanoic acid	Tyr
Asparagine	2-amino-3-carbamoylpropanoic acid	Asn
Glutamine	2-amino-4-carbamoylbutanoic acid	Gln
Aspartic acid	2-amino-1,4-butanedioic acid	Asp
Glutamic acid	2-amino-1,5-pentanedioic acid	Glu
Histidine	2-amino-3-(imidozolyl-5)-propanoic acid	His
Lysine	2,6-diaminohexanoic acid	Lys
Arginine	2-amino-5-guanidinopentanoic acid	Arg

22. pKa's of Side-Chains of Acidic and Basic Amino Acids

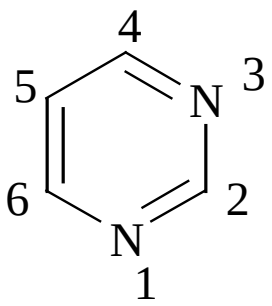
<table>
<tr><th colspan="3"><u>Acidic Amino Acids</u></th><th colspan="3"><u>Basic Amino Acids</u></th></tr>
<tr><th><u>Amino Acid</u></th><th><u>Side-Chain</u></th><th><u>pKa</u></th><th><u>Amino Acid</u></th><th><u>Side-Chain</u></th><th><u>pKa</u></th></tr>
<tr><td>Asp</td><td>- CH_2CO_2H</td><td>4.4</td><td>Lys</td><td>- $(CH_2)_4\overset{\oplus}{N}H_3$</td><td>10.2-10.5</td></tr>
<tr><td>Glu</td><td>- $CH_2CH_2CO_2H$</td><td>4.5</td><td rowspan="3">Arg</td><td rowspan="3">$-(CH_2)_3NH-\overset{\overset{\oplus}{N}H_2}{\overset{\|}{C}}-NH_2$</td><td rowspan="3">12.5-13</td></tr>
<tr><td>Cys</td><td>- CH_2SH</td><td>7.5-9.2</td></tr>
<tr><td>His</td><td>$-CH_2$  </td><td>6.8-7</td></tr>
<tr><td>Tyr</td><td>$-CH_2$  </td><td>9.9-10.3</td><td colspan="3"></td></tr>
</table>

23. pK VALUES FOR THE 20 COMMON AMINO ACIDS

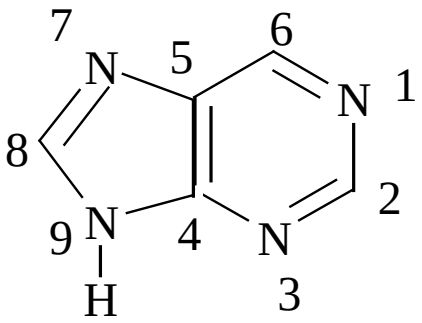
α-Amino Acid	$P(K_a)_1$ (α-COOH Group)	$P(K_a)_2$ (α-NH_3^+ Croup)	pK_R (Side Chain Group)	pI
Alanine	2.3	9.7	-	6.0
Arginine	1.8	9.0	12.5	10.8
Asparagine	2.1	8.8	-	5.4
Aspartic Acid	2.0	9.9	3.9	3.0
Cysteine	1.9	10.8	8.3	5.0
Glutamic Acid	2.1	9.5	4.1	3.2
Glutamine	2.2	9.1	-	5.7
Glycine	2.3	9.8	-	6.0
Histidine	1.8	9.3	6.0	7.6
Isoleucine	2.3	9.8	-	6.1
Leucine	2.3	9.7	-	6.0
Lysine	2.2	9.2	10.8	9.8
Methionine	2.1	9.3	-	5.8
Phenylalanine	2.2	9.2	-	5.5
Proline	3.0	10.6	-	6.3
Serine	2.2	9.2	-	5.7
Threonine	2.1	9.1	-	5.6
Tryptophan	2.4	9.4	-	5.9
Tyrosine	2.2	9.1	10.1	5.7
Valine	2.3	9.7	-	6.0

24. NOMENCLATURE OF NUCLEIC BASE

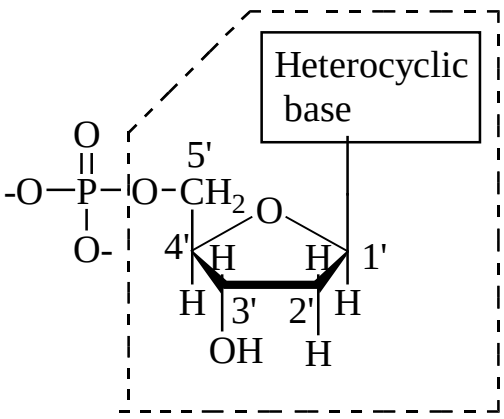
Name	IUPAC name
Adenine	6-aminopurine
Guanine	2-amino-6-hydroxypurine
Cytosine	4-amino-2-hydroxypyrimidine
Thymine	2,4-dihydroxy-5-methylpyrimidine
Uracil	2,4-dihydroxypyrimidine



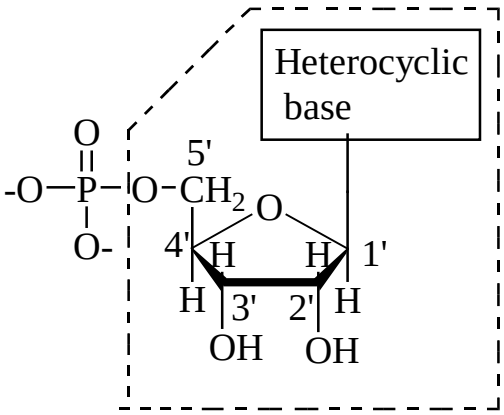
Pyrimidine



Purine



A



B

The general structure of a nucleotide found in DNA and RNA.

25. NOMENCLATURE OF FATTY ACIDS

Name	Condensed formula	IUPAC name
Myristic acid	(C_{14})	Tetradecanoic acid
Palmitic acid	(C_{16})	Hexadecanoic acid
Stearic acid	(C_{18})	Octadecanoic acid
Palmitoleic acid	(C_{16}); (Δ9)	Cis – 9-hexadecenoic acid
Oleic acid	(C_{18}); (Δ9)	Cis -9-octadecenoic acid
Linoleic acid	(C_{18}); (Δ9,12)	Cis,cis-9,12-octadecadienoic acid
Linolenic acid	(C_{18}); (Δ9,12,15)	Cis, cis, cis-9,12,15-octadecatrienoic acid

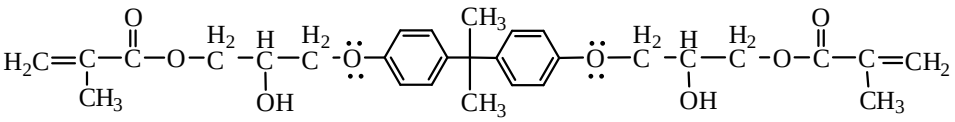
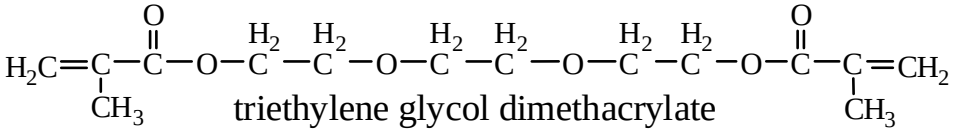
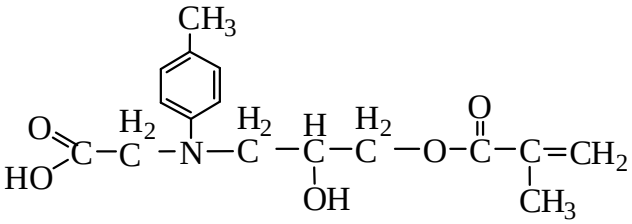
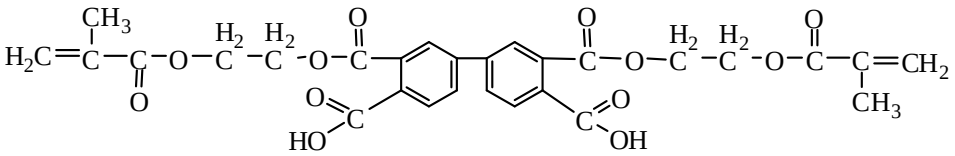
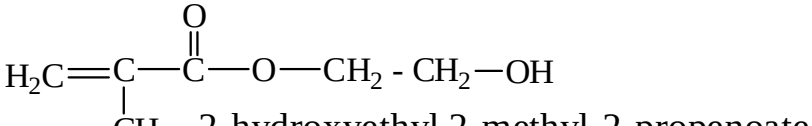
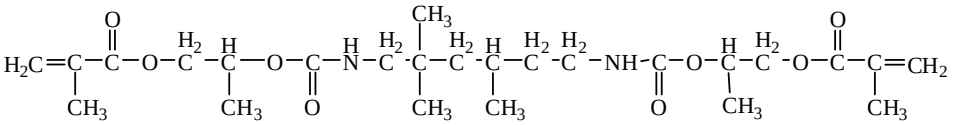
26. SATURATED FATTY ACIDS OF WAXES.

The common name	The structural formula	The systematic name	The melting point, ^{0}C
Lauric acid	$CH_3(CH_2)_{10}COOH$	dodecanoic acid	44
Myristic acid	$CH_3(CH_2)_{12}COOH$	tetradecanoic acid	54
Palmitic acid	$CH_3(CH_2)_{14}COOH$	hexadecanoic acid	64
Stearic acid	$CH_3(CH_2)_{16}COOH$	octadecanoic acid	70
Arachidic acid	$CH_3(CH_2)_{18}COOH$	eicosanoic acid	75
Eicosanecarboxylic acid	$CH_3(CH_2)_{19}COOH$	heneicosanoic acid	
Behenic acid	$CH_3(CH_2)_{20}COOH$	docosanoic acid	80
Lignoceric acid	$CH_3(CH_2)_{22}COOH$	tetracosanoic acid	84
Cerotinic acid	$CH_3(CH_2)_{24}COOH$	hexacosanoic acid	88
Melissic acid	$CH_3(CH_2)_{28}COOH$	triacontanoic acid	94

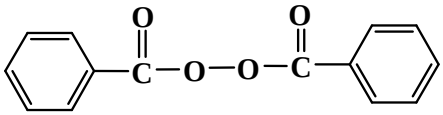
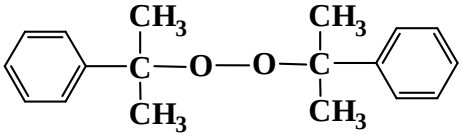
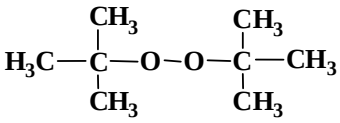
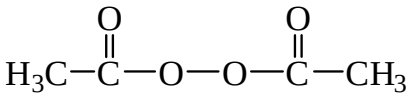
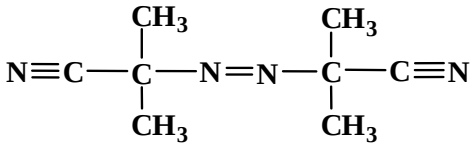
27. SATURATED ALCOHOLS OF WAXES.

The common name	The number of carbon atoms	The structural formula	The systematic name
	10	$CH_3(CH_2)_8CH_2OH$	1-decanol
	11	$CH_3(CH_2)_9CH_2OH$	1-undecanol
Lauryl alcohol	12	$CH_3(CH_2)_{10}CH_2OH$	1-dodecanol
Myristyl alcohol	14	$CH_3(CH_2)_{12}CH_2OH$	1-tetradecanol
Cetyl alcohol	16	$CH_3(CH_2)_{14}CH_2OH$	1-hexadecanol
Stearyl alcohol	18	$CH_3(CH_2)_{16}CH_2OH$	1-octadecanol
Ceryl alcohol	26	$CH_3(CH_2)_{24}CH_2OH$	1-hexacosanol
Myricyl alcohol	30 31	$CH_3(CH_2)_{28}CH_2OH$ $CH_3(CH_2)_{29}CH_2OH$	1-triacontanol 1-hentriacontanol

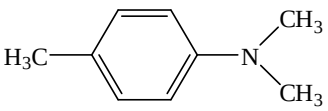
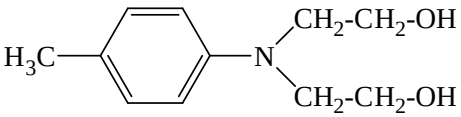
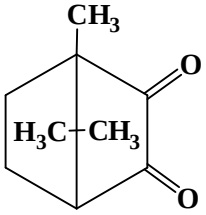
28. MONOMERS OF DENTAL POLYMERS.

The common name	The formula, the systematic name.
Acrylic acid	2-propenoic acid
Methacrylic acid	2-methyl-2-propenoic acid
Methyl acrylate	methyl 2-propenoate
Methyl methacrylate	Methyl 2-methyl-2-propenoate
Butyl methacrylate	Butyl 2-methyl-2-propenoate
Ethyl methacrylate	Ethyl 2-methyl-2-propenoate
Isoprene	2-methyl-1,3-butadiene
Bisphenol A (diane)	2,2-di(4-hydroxyphenyl)propane
Epychlorhydrine	3-chlor-1,2-epoxypropane
Bis-GMA	 bis-phenol-A-glycidylmethacrylat
TEG-DMA	 triethylene glycol dimethacrylate
NTG-GMA	
PMDP	 piromellit dimethacrylat
HEMA (2-hydroxy-ethyl methacrylate)	 2-hydroxyethyl 2-methyl-2-propenoate
UDMA (urethane dimetacrylate)	 2,2,4-trimethylhexamethylen-bis-(2-carbamoyloxyisopropyl)dimethacrylat

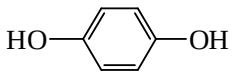
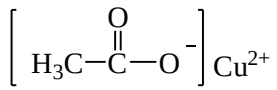
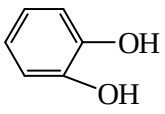
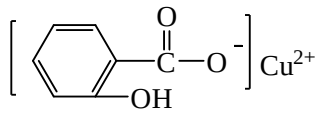
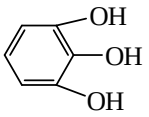
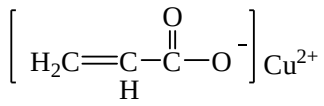
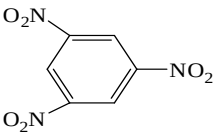
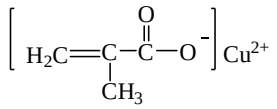
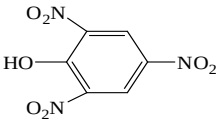
29. COMPOUNDS – REGULATORS OF RESTORATIVE DENTAL MATERIALS POLYMERIZATION REACTIONS. INITIATORS.

The common name	The formula
Benzoyl peroxide	
Dicumene peroxide,	
Tert-butyl peroxide	
Acetyl peroxide	
Azo-*bis*-isobutyronitrile (AIBN)	

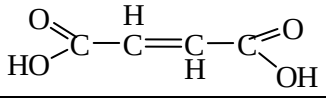
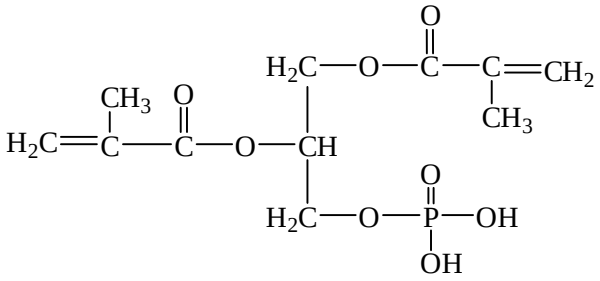
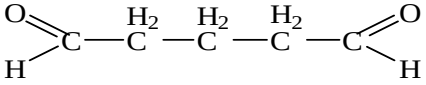
30. COMPOUNDS – REGULATORS OF RESTORATIVE DENTAL MATERIALS POLYMERIZATION REACTIONS. ACTIVATORS.

The common name	The formula
N,N-dimethyl-p-toluidine	
N,N-dihydroxyethyl-p-toluidine	
Camphorquinone (fotosensibilizator)	

31. COMPOUNDS – REGULATORS OF RESTORATIVE DENTAL MATERIALS POLYMERIZATION REACTIONS. INHIBITORS.

The common name	The formula		The common name	The formula
Hydroquinone			Acetic acid salts	
Catechol			Salicylic acid salts	
Pyrogallol			Acrylic acid salts	
1,3,5-trinitrobenzene			Methacrylic acid salts.	
Picric acid				

32. COMPOUNDS USED FOR ADHESION OF RESTORATIVE MATERIALS TO THE TOOTH TISSUES.

The common name	The formula
Maleic acid	
Dimethacrylate of glycerophoshporic acid	
Glutaraldehyde	
Polyethylenglycoldimethacrylat