

Vinnytsia National Pirogov Memorial Medical University
Biological and General Chemistry Department
Medical chemistry course

CONTROL TESTS 2
for practical lessons of bioorganic chemistry for foreign students



Vinnytsia 2017

A work sheet and methodical developments (Methodical of recommendation for practical classes from Bioorganic chemistry for 1-st year foreign students) are made by the employees of department of biological and general chemistry of VNMMU Pirogov in accordance with a curriculum, worked out on principles of the European credit-transfer system (ECTS) for higher medical establishments of Ukraine III - IV levels of accreditation for specialities of "Medical Affairs" direction of the preparation "Medicine" is in accordance with education qualification descriptions (EQD) and scientific professional programs (SPP) of the preparation of specialists, approved by an order MES Ukraine from 16.04.03 № 239.

It is considered and accepted on a meeting of the methodical soviet of medical-theoretical disciplines, protocol № 1 from 30.08.2017y.

It is discussed and approved on a meeting of the department of biological and general chemistry, protocol № 1 from 28.08.2017y.

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CHEMISTRY

Group № _____ 20__

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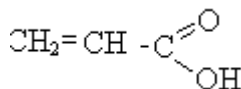
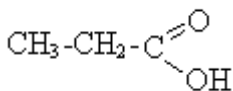
The students who studied chemistry at their countries we ask to read attentively the question given below. While answering the questions you should be attentive and do not be in a hurry. First of all try to remember all you have studied at home in chemistry and only then underline the answers you consider to be correct.

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Control test 1 "Nomenclature, isomerism, electronic structure of chemical bonds".

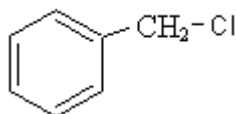
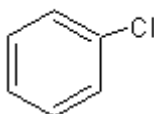
Sample 1

1. Write the configuration and staggered conformation of merkaptoethane C_2H_5SH .
2. Write the enantiomers of serine $CH_2(OH)-CH(NH_2)-COOH$.
3. Point the type and sign of electronic effects in molecules:



Sample 2

1. Write the configuration and staggered conformation of colamine $H_2N-CH_2-CH_2-OH$.
2. Write the enantiomers of cysteine $CH_2(SH)-CH(NH_2)-COOH$.
3. Point the type and sign of electronic effects in molecules:



Sample 3

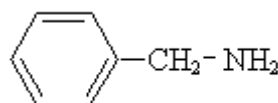
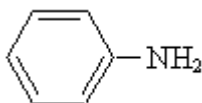
1. Write the configuration and staggered conformation of amino cyclohexane $H_2N-C_6H_{11}$.
2. Write the enantiomers of isoleucine $(CH_3)_2CHCH_2CH(NH_2)COOH$ in Fischer projection.
3. Point the type and sign of electronic effects in molecules:
 $CH_3-CH_2-NH_2$ $CH_2=CH-NH_2$

Sample 4

1. Write the structure, configuration and conformation of 2-chlorethanol
2. Write the enantiomers in Fischer projection of leucine $(CH_3)_2CH(CH_3)CH_2CH(NH_2)COOH$.
3. Point the type and sign of electronic effects in molecules:
 CH_3-CH_2-OH $CH_2=CH-OH$

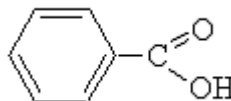
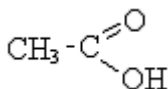
Sample 5

1. Write the configuration and conformation of chlorcyclohexane $C_6H_{11}-Cl$.
2. Write the enantiomers of phenylalanine $C_6H_5CH_2CH(NH_2)COOH$ in Fischer projection.
3. Point the type and sign of electronic effects in molecules:



Sample 6

1. Write the configuration and conformation of propyl cyclohexane $C_6H_{11}-C_3H_7$.
2. Write the enantiomers of aspartic acid $HOOC-CH_2-CH(NH_2)-COOH$ in Fischer projection.
3. Point the type and sign of electronic effects in molecules:



Sample 7

1. Write the configuration and conformation of cyclohexanol $C_6H_{11}-OH$.
2. Write the enantiomers of phenylalanine $C_6H_5CH_2CH(NH_2)COOH$ in Fischer projection.
3. Point the type and sign of electronic effects in molecules:

Control test 2 “Reactivity of alkanes, alkenes, arenes”

Sample 1

1. Types of bond breaking. Show it schematically.
2. Write the mechanism iodination 1-butene.
3. Write the mechanism of chlorination of aniline $C_6H_5-NH_2$.

Sample 2

1. Why does electrophil interact with alkenes but not nucleophil?
2. Write the mechanism of chlorination of benzaldehyde C_6H_5-COH .
3. Write the mechanism of bromination of butane.

Sample 3

1. Why do we observe the substitution reaction in alkanes but not the saturation one?
2. Write the mechanism of iodination of propene.
3. Write the mechanism of of bromination of phenol.

Sample 4

1. What the reagent (nucleophil Cl^- or Cl radical) do you use for chlorination of 2-methyl butane.
2. Write the mechanism of of chlorination of phenol.
3. Write the mechanism of chlorination of propene.

Sample 5

1. Write the mechanism of chlorination of isobutane.
2. Write the mechanism of of bromination of 3-hexene.
3. Which kind of reaction is characteristic for arenes?

Sample 6

1. Write the mechanism of bromination of 2-hexene.
2. Write the mechanism of iodination isopropane.
3. What are the nucleophiles? Write the examples.

Sample 7

1. Write the mechanism of of bromination of 3-methyl pentane.
2. What are the electrophiles? Write the examples.
3. Write the mechanism of of iodination of phenol.

Sample 8

1. Write the mechanism of chlorination of hexane.
2. Write the mechanism of of bromination of toluol.
3. What the reagent (nucleophil Cl^- or Cl radical) do you use for chlorination of 2- butene.

Sample 9

1. Write the mechanism of chlorination of hexane.
2. Write the mechanism of iodination isopropene.
3. What the reagent (nucleophil Cl^- or Cl radical) do you use for chlorination of butane.

Control test 3 “Reactivity of halides, alcohols, phenols and amines.”

Sample 1

1. Compare and explain the acidity of ethanol and propanol.
2. Compare and explain the basicity of methylamine and aniline.
3. Write the mechanism of the interaction between ethyl chloride and ammonia.

Sample 2

1. Compare and explain the acidity of phenol and p-dihydroxy benzene.
2. Compare and explain the basicity of methylamine and ammonia.
3. Write the mechanism of the interaction between propanol and hydrogen chloride.

Sample 3

1. Compare and explain the acidity of propanol and methanol.
2. Compare and explain the basicity of aniline and p-methylaniline.
3. Write the mechanism of the interaction between methyl chloride and ethylamine.

Sample 4

1. Compare and explain the acidity of p-methylphenol and phenol.
2. Compare and explain the basicity of primary and secondary amines.
3. Write the mechanism of elimination of trihydroxybutanoic acid.

Sample 5

1. Compare and explain the acidity of butanol and ethanol.
2. Compare and explain the basicity of aniline and p-aminobenzoic acid ($\text{H}_2\text{N} - \text{C}_6\text{H}_5 - \text{COOH}$)
3. Write the mechanism of the interaction between chloropropane and methyl amine.

Sample 6

1. Compare and explain the acidity of phenol and p-nitrophenol.
2. Compare and explain the basicity of ethylamine and colamine.
3. Write the mechanism of the interaction between ethyl bromide and trimethylamine.

Sample 7

1. Compare and explain the acidity of propanol and butanol.
2. Compare and explain the basicity of ethylamine and colamine.
3. Write the mechanism of the interaction between 2-bromobutane and ethylamine.

Sample 8

1. Compare and explain the acidity of phenol and propanol.
2. Compare and explain the basicity of ethylamine and propylamine
3. Write the mechanism of the elimination of malic acid ($\text{HOOC} - \text{CH}(\text{OH}) - \text{CH}_2 - \text{COOH}$)

Sample 9

1. Compare and explain the acidity of ethanol and colamine.
2. Compare and explain the basicity of ethyl propylamine and aniline.
3. Explain why the S_{N} mechanism is typical for alcohols.

Sample 10

1. Compare and explain the acidity of phenol and butanol.
2. Compare and explain the basicity of ethylamine and 2-chloroethylamine.
3. Write the mechanism of the interaction between butyl chloride and hydrobromide.

Control test 4 "Reactivity of aldehydes and ketons"

Sample 1

1. Write the reaction mechanism of acetaldehyde reduction.
2. Write the aldol condensation mechanism of acetaldehyde and benzaldehyde.

Sample 2

1. Write the mechanism of the Schiff's bases formation.
2. Write the reaction mechanism between diethylketons and hydrogen.

Sample 3

1. Write the mechanism of the hemiacetal formation after interaction of acetaldehydes and methanol.
2. Write the aldol condensation mechanism of propanal.

Sample 4

1. Write the reaction mechanism between acetaldehyde and propanol.
2. Write the reaction mechanism between pental and hydrogen cyanide (HCN).

Sample 5

1. Write the reaction mechanism of acetaldehyde and isopropanol with formation of hemiacetal.
2. Write the reaction mechanism between propanal and methyl amine.

Sample 6

1. Write the reaction mechanism of propanal reduction.
2. Write the reaction mechanism of hemiacetal and acetal formation after interaction of acetaldehyde and ethanol.

Sample 7

1. Write the reaction mechanism of propanal and methyl amine.
2. Write the aldol condensation mechanism between ethanal and propanal.

Sample 8

1. Write the mechanism of aldol condensation.
2. Write the reaction mechanism of acetaldehyde and ethyl amine.

Sample 9

1. Write the reaction mechanism of benzaldehyde and aniline.
2. Write the reaction mechanism of methyl ethyl keton and hydrogen.

Sample 10

1. Write the reaction mechanism of the hemiacetal formation after interaction of acetaldehyde and methanol.
2. Write the aldol condensation mechanism of propanal.

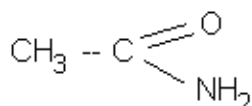
Control test 5 "Nucleophilic substitution in carboxylic acids and their derivatives"

Sample 1

1. Choose the acid possessing the higher acidity and explain it: $\text{CH}_3\text{-CH}_2\text{-COOH}$ or $\text{CH}_2=\text{CH-COOH}$.
2. Write the mechanism of ether formation after interaction of chloroanhydride of acetic acid and methanol.

Sample 2

1. Choose the acid possessing the higher acidity and explain it: $\text{CH}_3\text{-COOH}$ or HCOOH .
2. Write the mechanism of acidic hydrolysis of acetamide. Why does H^+ protonate oxygen atom but not nitrogen one?



Sample 3

1. Choose the acid possessing the higher acidity and explain it: $\text{CH}_3\text{-COOH}$ or $\text{Cl-CH}_2\text{-COOH}$.
2. Write the mechanism of ethyl propionate formation in the presence of acidic catalyst.

Sample 4

1. What is the acylation reaction? Write the acylating agents.
2. Write the mechanism of alkaline hydrolysis of methyl acetate. What is the medium of fat hydrolysis in human organism?

Sample 5

1. Choose the acid possessing the higher acidity and explain it: $\text{CH}_3\text{-COOH}$ or $(\text{CH}_3)_2\text{CHCOOH}$.
2. Write the mechanism of formation of acetamide using chloroanhydride and ammonia. How do you explain the higher reactivity of anhydrides and halogen anhydrides in comparison with carboxylic acids in the reaction of nucleophilic substitution.

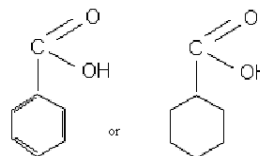
Sample 6

1. Choose the acid possessing the higher acidity and explain it: $\text{H}_2\text{N-CH}_2\text{-COOH}$ or CH_3COOH .
2. Write the mechanism of acidic catalysis between acetic acid and ethanol. Is it possible to use the alkaline catalyst for this reaction?

Sample 7

1. Choose the acid possessing the higher acidity and explain it: acetic acid or monofluoroacetic acid.
2. Write the mechanism of formation of anhydride after interaction of sodium acetate and chloroanhydride of acetic acid.

Sample 8



1. Choose the acid possessing the higher acidity and explain it:
2. Write the mechanism of methyl formate formation. What the catalyst is used?

Sample 9

1. Choose the acid possessing the higher acidity and explain it: acetic acid or trichloroacetic acid.
2. Write the mechanism of acidic hydrolysis of ethyl acetate. Write the examples of ethers in organism.

Sample 10

1. Choose the acid possessing the higher acidity and explain it: acetic acid or propionic acid.
2. Write the mechanism of alkaline hydrolysis of methyl formate. Why the alkaline hydrolysis is called saponification?

Control test 6 “HFA. Lipids. Phosphoglyceride”

Sample 1

1. Write the formation reaction of 1-*O*-palmitoyl-2,3-di-*O*-stearoylglycerol.
2. Write the configuration of linoleic acid.
3. Design the chemical method to distinguish between saturated and unsaturated fatty acids.

Sample 2

1. Write the formation reaction of fat containing one residue of linoleic acid and two molecules of palmitic acid.
2. Write the reaction equation of oxidation of oleic acid by potassium permanganate.
3. Call the products of hydrolysis of oil.

Sample 3

1. Write the reaction equation of interaction between iodine and trioleoylglycerol.
2. Write the differences between fat, oil and waxes.
3. What are the bile acids? Design the general formula of its.

Sample 4

1. Write the formation reaction of oil.
2. Write the configuration of linolenic acid.
3. What is hydrogenation of fats? Write the scheme of the reaction.

Sample 5

1. Write the structure of the compound containing the residues of palmitic acid, oleic acid, glycerol and phosphoric acid.
2. Prove that linolenic acid has double bonds.
3. Write the parent structure of steroids.

Sample 6

1. Write the reaction equation of hydrolysis of phosphatidylserine. What is the type of lipids?
2. Write the configuration of arachidonic acid.
3. Write the reaction equation of hydrolysis of 1-*O*-stearoyl-2-*O*-linolenoyl-3-*O*-palmitoylglycerol.

Sample 7

1. Write the structure of lecithin (phosphatidylcholine).
2. Write the structure of the compound containing the residues of arachidic acid, butyric acid, myristic acid and glycerol. Is it fat or oil?
3. What is the rancidity of fat or oil?

Sample 8

1. Write the reaction equation of hydrolysis of phosphatidylserine. What is the type of lipids?
2. Write the configuration of linolenic acid.
3. What is iodine number?

Sample 9

1. Write the reaction equation of hydrolysis of triacylglycerol in acidic medium.
2. Write the configuration of myristic acid.
3. Write the classification of lipids.

Sample 10

1. Write the formation reaction of fat containing one residue of stearic acid and two molecules of oleic acid.

Control test 8 "Amino acids"

Sample 1

1. Write the structural formulas of aromatic amino acids.
2. Write the reaction equation between cysteine and methanol.
3. Write the scheme of decarboxylation of valine.

Sample 2

1. Write the structural formulas of heterocyclic amino acids.
2. Write the reaction equation between arginine and ethanol.
3. Write the reaction equation between alanine and phenylisothiocyanate.

Sample 3

1. Write the structural formulas of monoamino-monocarboxylic acids.
2. Write the reaction equation between lysine and formaldehyde.
3. Write the reaction equation between valine and nitrous acids.

Sample 4

1. Write the structural formulas of oxy amino acids.
2. Write the reaction equation between glycine and ethanol.
3. Write the scheme of decarboxylation of leucine.

Sample 5

1. Write the structural formulas of diamino-monocarboxylic acids.
2. Write the reaction equation between glutamic acid and nitrous acid.
3. Write the reaction equation between glycine and phenylisothiocyanate.

Sample 6

1. Write the structural formulas of monoamino-dicarboxylic acids.
2. Write the reaction equation between asparagines and propanol.
3. Write the scheme of decarboxylation of methionine.

Sample 7

1. Write the structural formulas of essential amino acids.
2. Write the scheme of ester formation of any amino acid.
3. Write the scheme of acylation of threonine.

Sample 8

1. Write the structural formulas of sulfur-containing amino acids.
2. Write the reaction equation between threonine and ethanol.
3. Write the scheme of deamination of tryptophan.

Sample 9

1. Write the structural formulas of essential amino acids.
2. Write the scheme of ester formation of methionine.
3. Write the known for you reactions of quantitative determination of amino acids.

Control test 9 “Proteins”

Sample 1

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Ala-Val. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Ala-Val using Edman degradation method.

Sample 2

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Thr-Asp. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Thr- Asp using Edman degradation method.

Sample 3

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Lys-Cys. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Lys-Cys using Edman degradation method.

Sample 4

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Pro-Cer. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Pro-Cer using Edman degradation method.

Sample 5

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Arg-Met. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Arg-Met using Edman degradation method.

Sample 6

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Gly-Ile. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Gly-Ile using Edman degradation method.

Sample 7

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Val-Leu. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Val-Leu using Edman degradation method.

Sample 8

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Leu-Val. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Leu-Val using Edman degradation method.

Sample 9

1. Using the method of the protection and activation of carboxyl group, synthesize the dipeptide Ile-Gly. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Ile-Gly using Edman degradation method.

Sample 10

1. Using the method of the blocking (protection) and activation of carboxyl group, synthesize the dipeptide Met-Arg. What is the pH range of its IEP.
2. Determine the N-terminal amino acid in dipeptide Met-Arg using Edman degradation method.

Control test 10 “Monosaccharides”.

Sample 1

1. Write the structural formula of α -D-glucopyranose.
2. Write the scheme of β -fructose alkylation. Point the linkage types of the product.

Sample 2

1. Write the structural formula of β -D-mannopyranose.
2. Write the scheme of α -glucose acylation. Point the linkage types of the product.

Sample 3

1. Write the scheme of galactose reduction.
2. Write the scheme of the interaction between α -mannose and methyl chloride.

Sample 4

1. Write the structural formula of β -D-fructofuranose.
2. Write the scheme of N-glucoside formation of α -galactose.

Sample 5

1. Write the structural formula of glucopyranose-6-phosphate.
2. Write the scheme of O-glucoside formation of fructose.

Sample 6

1. Write the reaction equations that prove the polyatomic structure of fructose.
2. Write the scheme of α -D-fructofuranose acylation. Point the linkage types of the product.

Sample 7

1. Write the structural formula of ribopyranose-6-phosphate.
2. Write the scheme of O-methyl- β -D-glucofuranoside hydrolysis. Point the linkage types exposing to hydrolysis.

Sample 8

1. Write the scheme of the helate formation of fructose.
2. Write the scheme of N-ethyl- β -D-glucopyranoside formation. Point the linkage types of the product.

Sample 9

1. Write the scheme of qualitative reaction determination of fructose.
2. Write the scheme of α -D- glucopyranose acylation. Point the linkage types of the product.

Sample 10

1. Write the scheme of Benedict's test on glucose.
2. Write the scheme of O-methyl- β -D-glucopyranoside formation. Point the linkage types of the product.

Control test 11 “Oligosaccharides & Polysaccharides”

Sample 1

1. Write the reaction equation of sucrose and methyl chloride. Point the linkage types of the product.
2. Write the formula of disaccharide fragment of amilose. Point the linkage type.

Sample 2

1. Write the formula of lactose. Point the linkage type. Write the reaction proving the reducing property of its.
2. Write the scheme of alkylation of cellulose disaccharide fragment. Point the linkage type of the product.

Sample 3

1. Write the reaction equation of sucrose hydrolysis. What do the substabces exhibit the reducing properties.
2. Write the formula of disaccharide fragment of glycogen. Point the linkage type.

Sample 4

1. Write the reaction equation of lactose and acyl chloride. Point the linkage types of the product.
2. Write the formula of disaccharide fragment of cellulose. Point the linkage type.

Sample 5

1. Write the formula of sucrose. Point the linkage type. Is sucrose related to reducing or nonreducing saccharides? Explain the answer.
2. Write the scheme of alkylation of amilose disaccharide fragment. Point the linkage types of the product.

Sample 6

1. Write the hydrolysis reaction of completely alkylated lactose. What do the substabces exhibit the reducing properties.
2. Write the formula of disaccharide fragment of chitin. Point the linkage type.

Sample 7

1. Write the reaction equation of sucrose alkylation. Point the linkage types of the product.
2. Write the hydrolysis reaction of starch. Qualitative reaction determination of starch.

Sample 8

1. Write the hydrolysis reaction of lactose. What linkage type is responsible for hydrolysis.
2. Write the reaction equation of alkylation of cellulose disaccharidefragment. Point the linkage types of the product.

Sample 9

1. Write the reaction equation of lactose and methyl bromide. Point the linkage types of the product.
2. Write the hydrolysis reaction of starch. Qualitative reaction determination of starch.

Sample 10

1. Write the reaction equation of sucrose and acetyl chloride. Point the linkage types of the product.
 2. Write the hydrolysis reaction of alkylated disaccharide fragment of cellulose.
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Control test 12 “Heterocyclic compounds”

Sample 1

1. Explain the basic property of pyridine. Write the reaction equation between pyridine and HI.
2. Write the structure of uric acids and its salt. What do the imbalances in organism take place due to the formation of insoluble salts of uric acid?

Sample 2

1. Write the scheme of methylpyridinium iodide.
2. Write the reaction equation of pyridine reduction with formation of piperidine.

Sample 3

1. Write the lactam and lactim forms of uracil.
2. Explain acidic and basic properties of purine.

Sample 4

1. Write keto and enol forms of guanine.
2. Explain the difference in the electronic structure of nitrogen atom in pyrrole and nitrogen atom in pyridine.

Sample 5

1. Explain the tautomeric forms of uric acid. What is the type of tautomerism?
2. Explain the basic property of pyridine and write its reaction with strong acids.

Sample 6

1. Explain the amphoteric property of pyrazole.
2. Write the reaction equation of pyridine with water.

Sample 7

1. Write the reaction equation of pyridine with hydrochloric acid.
2. Write the tautomeric forms of thymine.

Sample 8

1. Write the scheme of formation of pyridinium salt.
2. Write the structural formula of adenine; point the nature of nitrogen atoms.

Sample 9

1. Explain the acidic and basic properties of uric acid. How are its salts called?
2. Write the lactam and lactim forms of thymine.

Sample 10

1. Write the lactam and lactim forms of cytosine.
2. Explain the basic property of pyridine. Write pyridine reaction equation with hydrochloric acid.

Control test 13 "Nucleic acids"

Sample 1

1. Write the structure of lactim and lactam form of uracil.
2. Write the scheme of hydrolysis of deoxyadenilic acid respectively the ester linkage.
3. Write the structure of dinucleotide fragment of DNA-TG.

Sample 2

1. Write the structure of adenine and point the pyrrole and pyridine nitrogen atom.
2. Write the structure of cytidylic acid, point the linkage types. Write the hydrolysis of it.
3. Write the structure of dinucleotide part of RNA-UG.

Sample 3

1. Write the structure of lactim and lactam form of thymine.
2. Write the structure of deoxyadenilic acid, point the linkage types. Write the hydrolysis of it.
3. Write the structure of dinucleotide part of DNA-CG.

Sample 4

1. Write the structure of deoxyguanosine and point the linkage types.
2. Write the structure of uridine-5'-phosphate, point the linkage types, write the hydrolysis of it.
3. Write the structure of dinucleotide part of DNA-AT

Sample 5

1. Write the structure of cytidine and point the linkage types.
2. Write the structure of deoxyguanylic acid, point the linkage types. Write the hydrolysis of it.
3. Write the structure of dinucleotide part of RNA-UA.

Sample 6

1. Write the structure of deoxyuridine and point the linkage types.
2. Write the structure of adenosine-5'-phosphate, point the linkage types, write the hydrolysis of it.
3. Write the structure of dinucleotide part of DNA-CT.

Sample 7

1. Write the structure of adenosine and point the linkage types.
2. Write the structure of deoxycytidilic acid, point the linkage types. Write the hydrolysis of it.
3. Write the structure of dinucleotide part of DNA-AG.

Sample 8

1. Write the structure of deoxythymidine and point the linkage types.
2. Write the structure of adenilic acid, point the linkage types, write the hydrolysis of it.
3. Write the structure of dinucleotide part of RNA-AC.

Sample 9

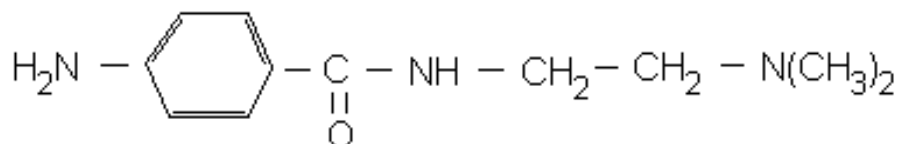
1. Write the structure of guanosine and point the linkage type.
2. Write the structure of deoxythymidylic acid, point the linkage types. Write the hydrolysis of it.
3. Write the structure of dinucleotide part of DNA-GU.

Sample 10

1. Write the structure of deoxycytosine and point the linkage types.
2. Write the structure of adenylic acid, point the linkage types, write the hydrolysis of it.
3. Write the structure of dinucleotide part of RNA-GU.

THEORETICAL ESSENCIAL PRINCIPLES OF STRUCTURE AND REACTIVITY OF BIOORGANIC COMPOUNDS

1. Colamine (ethanolamine) participate in biosynthesis of cephalin (phosphatidyl-ethanolamine). Write the structure, configuration and conformation of colamine.
2. Cancer of urinary bladder is stimulated by the action of aminobenzene. Explain the reciprocal influence of amino group and benzene ring.
3. In clinical diagnostics sulfosalicylic acid is used for determination of protein in biological liquids. Point the type and sign of electronic effects of substitutes in sulfosalicylic acid molecule.
4. Hydrochloride Novocainamide is used for treatment of heart arrhythmia. Determine the protonation center in the given below molecule.



5. The high boiling temperature of imidazole (256 °C) is caused by the intermolecular hydrogen bonds of its molecules. Why do imidazole molecules form the given bonds?
6. There are two test tubes containing sucrose solution and lactose solution. How do you chemically determine the content of every test tube?
7. How do you determine the high quality of acetyl salicylic acid? Write reaction equations.
8. How do you distinguish the oil and fat?
9. Qualitative reactions for amino acids.
10. What are ketone bodies? The chemical conversion in human organism.

PRACTICAL ESSENCIAL PRINCIPLES LABORATORY WORK

Experiment 1

Determine glycerin, acetic acid and glucose using the same chemical reagents.

Experiment 2

There are three test tubes with HCl, formic acid and acetaldehyde. Determine the content of every test tube.

Experiment 3

There are three test tubes with starch, sucrose and amino acetic acid. Determine the content of every test tube. Write the reaction equations.

Experiment 4

There are three test tubes with glycerin, tartaric acid and lactose. Determine the content of every test tube.

Experiment 5

There are three test tubes with glucose, salicylic and ethandiol. Determine the content of every test tube. Write the reaction equations.

Experiment 6

There are two test tubes. Determine which of them contains acetone.

