

ORGANIC CHEMISTRY

1. 2014 BAZA (SOCIAL)

1) From the line of substances: CH_3OH , $\text{CH}_3\text{-CH=CH}_2$, $\text{CH}\equiv\text{CH}$, CH_3COOH

select the substances for which the statements below are true and write the corresponding formulas in the reserved space.

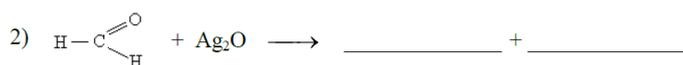
No.	Substance is used	Formula of substance
1.	as solvent for lacquers and paints	
2.	for welding works	
3.	to preserve food products in food industry	
4.	for obtaining polypropylene	

2) For one of the substances from the proposed line, write an equation of the obtaining reaction:

.....

2. 2014 BAZA (SOCIAL)

Finalize the schemes of proposed reactions with corresponding formulas and Coefficients



3. 2014 BAZA (SOCIAL)

Fill in the blank spaces in the table

Structural semideveloped formula of substance	Name of substance	Class of organic compounds
$\text{CH}\equiv\text{C}-\text{CH}_3$		
	butane-1-ol	
		ester

4. 2014 BAZA (SOCIAL)

Circle letter A if statement is true and letter F if statement is false.

- 1) T F Phenol has molecular formula $\text{C}_6\text{H}_5-\text{NH}_2$.
- 2) T F 2-metilpropane is isomer with 2- metilbutane.
- 3) T F Starch is identified easier by iodine solution.
- 4) T F Glycerine is used in production of explosive substances.
- 5) T F Synthetic rubber is obtained from butadiene.
- 6) T F Group $-\text{CO}-\text{NH}-$ is called peptide group.
- 7) T F Fats are heavier than water.

5. 2014 BAZA (REAL)

From the row of organic substances with composition: C₄H₈, C₅H₈, C₄H₁₀ choose and write formula of the substance which is an homologue of ethylene:

I. Complete the blank spaces of the table for the selected substance:

1	Name of class of organic compounds	
2	Semi-developed structure formula of substance	
3	Name of substance according to systematic nomenclature	
4	Semi-developed structure formula of a possible izomer	
5	Name of izomer according to systematic nomenclature	

II. Write a reaction equation of obtaining ethylene:
.....

6. 2014 BAZA (REAL)

For each characteristic presented in column B propose a corresponding organic substance and write its semi-developed structure formula in the reserved space from column A.

A	B
Semi-developed structure formula	Characteristic of substance
1)	1) It corresponds with general formula C_nH_{2n+2O} ;
2)	2) Contains two bonds π ;
3)	3) It is a result of esterification reaction;
4)	4) It is a component of natural gas;
5)	5) Can be identified with $Cu(OH)_2$.

7. 2014 T1 (REAL)

For each feature in the column B proposes an organic substance and write the corresponding structural formula semidesfășurată her-space A column.

A	B
Condensed structural formula	property of substance
1)	1) has general formula C_nH_{2n+2}
2)	2) contain pi bond
3)	3) It is a product of photosynthesis;
4)	4) decolorize the solution of potassium permanganate;
5)	5) Burning form CO_2 , H_2O and N_2 ;
6)	6) It is used to produce rubber

8. 2014 T1 (REAL)

Organic substances of the row of composition: C₄H₁₀O, C₅H₁₀O, C₄H₈O₂ select and write the formula of the substance is a homologue of methanol:

I. Fill in the blanks in the table for the selected substance:

1	Name of class of organic compounds	
2	Semi-developed structure formula of substance	
3	Name of substance according to systematic nomenclature	
4	Semi-developed structure formula of a possible izomer	
5	Name of izomer according to systematic nomenclature	

II. Write a reaction equation to obtain a methanol.

.....

9. 2014 T1 (REAL)

Are given substances: copper(II)hydroxide, water, nitric acid, bromine water, sodium hydroxide(aq.).

Choose from the range proposed many possible reagent for each of the substances listed below and write equations corresponding reactions, using structural formulas for organic compounds semidesfășurate:

- 1) propyne:
- 2) methylamine:
- 3) etan-1,2-diol:
- 4) methylacetate:

10. 2014 T1 (REAL)

Based essential oils are used in perfumery aldehydes to create compositions with floral-citrus shades.

Solve the problem. Determine the molecular formula of the aldehyde from the extracted oil of peppermint, where the interaction of a sample with a weight of 8.6 g aldehyde with an excess of an ammonia solution of silver oxide to form a residue weighing 21.6 g metal

11. 2014 T1 (SOCIAL)

Circle letter T if the statement is true and letter F if the statement is false

- 1) A F General Formula for alkynes is C_nH_{2n-2} .
- 2) A F Butane-1-ol is isomer with 2-methylpropane-1-ol.
- 3) A F Starch is a monosaccharide.
- 4) A F Polialcoolii se identifică cu hidroxid de cupru (II).
- 5) A F Fats are used in producing soap.
- 6) A F The esters are products of the interaction of the aldehyde alcohols.
- 7) A F Benzene is a colorless liquid with specific odor.

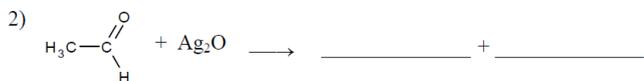
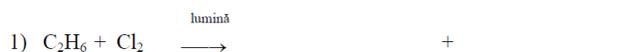
12. 2014 T1 (SOCIAL)

Fill in the blanks in the table:

Formula de structură semidesfășurată a substanței	Denumirea substanței	Clasa de compuși organici	Un domeniu concret de utilizare a substanței
			Obținerea polietilenei
$CH_2=CH-CH=CH_2$			
	Acid acetic (acid etanoic)		

13. 2014 T1 (SOCIAL)

Finalizează schemele de reacții propuse cu formulele și coeficienții corespunzători:



14. 2014 T1 (SOCIAL)

1) From the given of the substances: $C_6H_5 - NH_2$; $CH_2 = CH - CH_3$; $CH \equiv CH$; $CH_2OH - CH_2OH$; $C_6H_{12}O_6$
 select substances for which the following statements are true and that the formulas score-space

Nr	Substanța se utilizează	Formula substanței
1.	la producerea coloranților	
2.	la obținerea polipropilenei	
3.	la prepararea benzenului	
4.	la prepararea alcoolului etilic	

15. 2014 PRE (REAL)

Pentru fiecare caracteristică prezentată în coloana B propune o substanță organică corespunzătoare și scrie formula de structură semidesfășurată a ei în spațiul rezervat din coloana A.

A	B
Condensed structural formula	property of substance
1)	1) General formula C_nH_{2n-2}
2)	2) It contains only carbon atoms in sp^3 hybridization condition;
3)	3) It is an organic derivative of ammonia;
4)	4) It is a product of the dehydration reaction;
5)	5) Forming a deep blue color solution with, copper (II) hydroxide;
6)	6) It is used as flavoring.

16. 2014 PRE (REAL)

Among the given organic compounds: $C_4H_{10}O$, $C_5H_{10}O$, $C_4H_8O_2$ select and write the formula of the substance is a homologue of formic acid:

I. Fill in the blanks in the table for the selected substance:

1	Denumirea clasei de compuși organici	
2	Formula de structură semidesfășurată a substanței	
3	Denumirea substanței conform nomenclaturii sistematice	
4	Formula de structură semidesfășurată a unui izomer posibil	
5	Denumirea izomerului conform nomenclaturii sistematice	

II. Write a reaction equation to obtain formic acid:

17. 2014 PRE (REAL)

Sînt date substanțele: copper(II)hydroxide, water, nitric acid, bromine water, sodium hydroxide(aq.).

Choose from the range proposed each reagent possible for each of the substances listed below and write equations corresponding reactions, using structural formulas for organic compounds semidesfășurate:

- 1) but-1-ene:
- 2) benzene:
- 3) propane-1-ol:
- 4) aminoetanoic acid:

18. 2014 PRE (REAL)

Aldehydes in small concentrations suave scents that blends perfectly with the natural skin smell and increases base notes of perfumery compositions. Solve the problem: Determine the molecular formula of the aldehyde to enhance the smell of rose,

where the interaction of the sample with a mass of 14.2 g of the aldehyde with an excess of an ammonia solution of silver oxide to form a metal deposit with a mass of 21.6 g of.

19. 2014 PRE (SOCIAL)

Circle letter T if the statement is true and letter F if the statement is false.

- 1) A F Benzene and phenol are isomers.
- 2) A F Proteins were obtained from the polycondensation of α -amino acids.
- 3) A F Cellulose is a natural polymer.
- 4) A F Formula of methylamine is $\text{CH}_3\text{-NH}_2$.
- 5) A F Fats are well soluble in water.
- 6) A F Due to their fragrance esters are used as flavoring.
- 7) A F Aldehydes can be identified using copper(II)oxide

20. 2014 PRE (SOCIAL)

Fill in the blanks in the table:

Formula de structură semidesfășurată a substanței	Denumirea substanței	Clasa de compuși organici
		alcan
$\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3$		
	etanal	

21. 2014 PRE (SOCIAL)

Complete reaction schemes proposed corresponding formulas:

- 1) $\text{CH}_4 + \text{Cl}_2 \xrightarrow{\text{lumină}} \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
- 2) $\text{CH}_3\text{COOH} + \text{KOH} \longrightarrow \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
- 3) $\text{CH}_3\text{-OH} + \text{CuO} \longrightarrow \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \text{H}_2\text{O}$

22. 2014 PRE (SOCIAL)

1) Din șirul de substanțe: $\text{CH}_2 = \text{CH}_2$; $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$; $\text{CH}_3 - \text{CH}_2 - \text{OH}$; $\text{C}_6\text{H}_5 - \text{OH}$ select substances for which the following statements are true and that the formulas score-space

	Uses of substance	Formula of substance
1	To produce medicine	
2	To obtain polyethylene	
3	To obtain synthetic rubber	
4	To produce fenol formaldehyde resins	

2) For one of the substances proposed string write an equation for the reaction of preparation:

23. 2013 PRE (REAL)

Circle letter T if the statement is true and letter F if the statement is false.

- 1) T F- The general formula $\text{C}_n\text{H}_{2n-2}$ corresponds to saturated hydrocarbons.
- 2) T F- The carbon atoms, between which one σ bond and another π bond is formed, are in sp^2 hybridization state.
- 3) T F- Propanoic acid methyl ester is the isomer of the 2-metilpropanoic acid.

- 4) T F - Aniline is obtained through the reduction of nitrobenzene.
 5) T F- The iodine solution turns the starch suspension to blue.
 6) T F- Formaldehyde is used to preserve anatomical preparations.

24. 2013 PRE (REAL)

1) Fill in the gaps of the table that corresponds to an alcohol, used as an additive to produce biofuel:

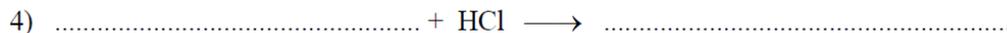
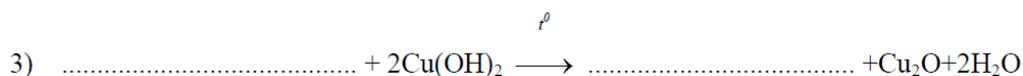
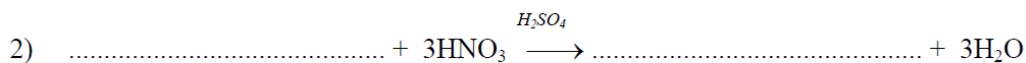
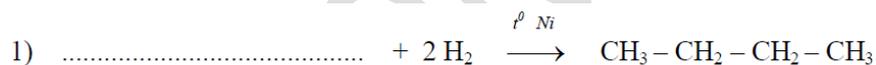
	Semi-large structural formula of the substance	The name of the substance according to the systematic nomenclature
Alcohol	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH} - \text{CH}_2 - \text{OH} \\ \\ \text{CH}_3 \end{array}$	
Chain isomer of the proposed alcohol		
The position isomer for the functional group of the proposed alcohol		
Homologue of the proposed alcohol		

2) Provide arguments for a field where the ethyl alcohol is used, filling in the following statement:

The ethyl alcohol is used in, because

25. 2013 PRE (REAL)

Fill in the gaps of the proposed reactions schemes with the semi-large structural formulas of the corresponding organic compounds:



26. 2013 PRE (REAL)

Dichloroethane is used as a solvent and as a raw material in the synthesis of various organic compounds.

Solve the problem. The dichloroethane obtained as a result of complete chlorination of ethylene with the volume of 11,2 l at SPT was processed with excess of aqueous potassium hydroxide solution. Calculate the mass of ethylene glycol, which can be obtained as a result of these reactions.

27. 2013 PRE (SOCIAL)

Circle letter T – if the statement is true and letter F – if the statement is false:

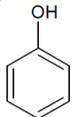
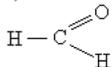
- 1) T F -For alkanes addition reactions are characteristic.
 2) T F -Alcadiens are hydrocarbons with a double bond.
 3) T F- Monomers of the proteins are α – amino acids.

- 4) T F -Starch is formed at the complete oxidation of glucose.
 5) T F -Glycerin and superior carboxylic acids are formed at the hydrolysis of fats.
 6) T F -Methanol refers to toxic substances.
 7) T F The basic component of natural gas is butane.
 8) T F- Esters are used as flavorings

28. 2013 PRE (SOCIAL)

As result of petroleum processing millions of tons of organic substances are obtained per year.

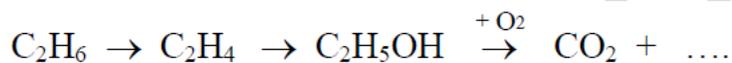
Name the substances:

a) $\begin{array}{c} \text{CH} \equiv \text{C} - \text{CH} - \text{CH}_2 - \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$ _____	b)  _____
c) $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH} = \text{CH}_2 \\ \\ \text{CH}_3 \end{array}$ _____	d)  _____

29. 2013 PRE (SOCIAL)

The ethanol is used as a very active additive that increases the quality of gasoline.

Form the equations of reactions for the chain of transformations:



- 1.....
 2.....
 3.....

30. 2013 PRE (SOCIAL)

Hydrocarbons and their derivates are used in all areas of our lives.

Write on the left side of the numbers in column A the corresponding letter of the used area from column B:

A	B
..... 1. Methane	a) manufacture of cosmetic products
..... 2. glycerin	b) obtaining colorants
..... 3. acetic acid	c) as a fuel
..... 4. aniline	d) production of plastics
..... 5. propylene	e) as a preservative

31. 2012 BAZA (REAL)

For each characteristics presented in A column, choose an organic substance from B column and write its formula in the free space.

A**The characteristics of substance**

-1. It is the main component of the natural gas
-2. Is a part of the homologous series with the general formula
 $C_nH_{2n}O_2$
-3. It is a natural polymer
-4. Undergoes to the hydrolysed reaction
-5. Is obtained from the trimerisation of ethyne
-6. Can be identified with the potassium permanganate solution

B**Substance**

- a) *ethyl acetate*
- b) *starch*
- c) *propene*
- d) *methane*
- e) *benzene*

32. 2012 BAZA (REAL)

4-aminobutanoic acid is used in medicine to treat the cerebrovascular diseases, namely „the attention deficit” syndrome.

A. Write for the 4-aminobutanoic acid:

- 1) condensed structural formula:
- 2) the condensed formula of a possible isomer and its name according to the IUPAC system:

B. Fill in the table for the two compounds which have one of the indicated chemical property, contains the same carbon atom number as the 4-aminobutanoic acid, but belongs to different organic compound class.

The chemical property	Condensed structural formula of the compound	The name of the substance according to the IUPAC system:	Name of class compounds
Reacts with bromine water			
Reacts with sodium metal			

33. 2012 BAZA (REAL)

substances: ethanol, chloroethane, formic acid, sodium hydroxide, copper oxide (II).

I. Write the chemical equation for three possible reactions within the suggested compounds.

- 1)
- 2)
- 3)

II. Indicate the specific use area for one of the organic substances from the sequence:

Substance is used

.....

34. 2012 BAZA (REAL)

Solve the problem. A young chemist has decided to try his hands at mirrors manufacturing. In the glucose solution of 11,25 g by mass and with mass percent of glucose - 40%, he has added the excess of ammonia solution of silver oxide and poured the obtained mixture on a previously prepared glass surface. Calculate:

- 1) the silver mass which can be obtained from the complete oxidation of glucose;
- 2) how many mirrors, with the surface of 0,5 m², can be obtained by the young chemist, if for 1 m² is necessary minimum 0,9 g of metallic silver.

35. 2012 BAZA (SOCIAL)

Please select and write in the reserved space the word from brackets that correctly fills each of the statements:

- 1) Synthetic rubber can be obtained from the polymerization of (butene/butadiene).
- 2) Glucose is (monosaccharide/polysaccharide).
- 3) At the interaction of ethyl alcohol with sodium one of the products of the reaction will be (water/hydrogen).
- 4) Grease are organic substances..... soluble/insoluble) In water.
- 5) The reaction of de esterification is the reaction between the alcohol with (alcohol/acid).
- 6) Aniline is obtained at the reduction with (hydrogen/oxygen) of nitrobenzene.
- 7) Homologues are the substances from the same class that have (the same/different) number of atoms of carbon.

36. 2012 BAZA (SOCIAL)

Solve the problem. For boiling a liter of water on the stove it is necessary to use household gas (propane) with the volume 22,4 l (STP). Please calculate the volume of the needed oxygen for the burning of propane.

37. 2012 BAZA (SOCIAL)

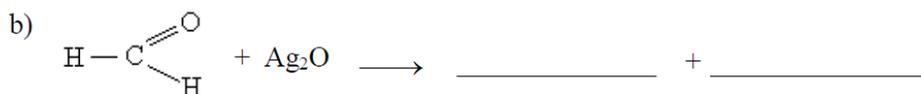
As result of the petroleum refining can be obtained a few thousands of substances – hydrocarbons and their derivatives that can be used in all fields of our life.

In the empty space on the left, for each formula of column I, please write the letter that indicates the name of the substance from column II.

I	II
___ 1. $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{C} \equiv \text{CH}$	A. benzene
___ 2. $\text{CH}_3 - \text{NH}_2$	B. 3-methylbutan-2-ol
___ 3. 	C. pent-1-yne
___ 4. $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \underset{\text{OH}}{\text{CH}} - \text{CH}_3$	D. 3-methylbut-1-yne
	E. methylamine
	F. ethanal

38. 2012 BAZA (SOCIAL)

Finish the scheme of reactions, filling them with formulas and coefficients:



39. 2012 BAZA (SOCIAL)

Ethylene is the most produced organic substance in the world; in 2008 the total global production of ethylene was 113 million tons and continues growing 2-3 % annually.

Describe ethylene according to the plan:

A. Structural condensed formula

B. Two physical properties: a)
b)

C. Chemical properties.

Please write the equation of the reaction of interaction of ethylene with one of the following substances:

Cl₂, H₂, HCl, H₂O, O₂

40. 2012 PRE (REAL)

There are the organic substances:

A. glycerin; B. glucose; C. ethyne; D. benzene.

Choose a substance from the sequence for each characteristics and write its formula in the free space.

Nr.	The substance characteristics	The substance
1	All the carbonic atoms are in the hybridization sp ² state	
2	Belongs to a homologous series with C _n H _{2n-2} general formula	
3	Is a butine homologue	
4	Is used to obtain the ethanol	
5	Is obtained from hydrolysis of fats	
6	Can be identified with hydroxide cooper (II)	

41. 2012 PRE (REAL)

On the labels of two containers A and B the same molecular formula C₂H₄O₂ is indicated. Studies have shown the following:

- The substances in containers A and B belong to different classes of organic compounds;
- The substance in containers A reacts with sodium hydroxide, sodium, ethanol;
- The substance in containers B interreacts with water (hydrolysis) and sodium hydroxide (basic hydrolysis).

I. Write the semi-large structural formula for each compound:

A..... B

II. Using the semi-large structural formulas for organic substances, write the equation reaction for each compound with one the reagents mentioned above.

A.....

B

42. 2012 PRE (REAL)

The organic compounds are widely used in the chemical synthesis and also in the daily activities.

Fill in the table:

The class of the organic compound	Semi-large structural formula of the substance	The name of the substance according to the systematic nomenclature	The specific area of the substance use
	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{C} \\ \backslash \\ \text{H} \end{array}$		
			Production of the synthetic rubbers

Write the equation reaction to obtain one of the proposed substances using for the organic compounds the semi-large structural formulas:

43. 2012 PRE (REAL)

One of the directions of optimization of chemical processes aims at finding the effective catalysts.

Solve the problem. The Propane has undergone reaction in the presence of new catalysts. The reaction product represents a mixture of propane and propylene with the volume of 11,2 l (c. n.). This mixture completely discolors water with bromine, weighing 200g, the bromine mass constituting 3,2%.

a) Calculate the volume of bromine in the given mixture.

b) Formulate the conclusion according the obtained result, if the investigated catalysts are effective.

44. 2012 PRE (SOCIAL)

Complete the sentences.

1). Isomers have the same but different

2). Synthetic rubber is obtained from polymerization of hydrocarbon

3). In the composition of amines carbon, hydrogen and are found

4). Homologue of ethanal is

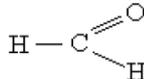
5). Proteins can decompose by the reaction of

6). Glucose is obtained from hydrolysis of

7). General Formula of alkanes is

45. 2012 PRE (SOCIAL)

The result obtained by petroleum processing thousands of substances - hydrocarbons and their derivates used in all areas of daily life. In the space to the left of each formula in column I write the letter corresponding to the name of the substance in column II:

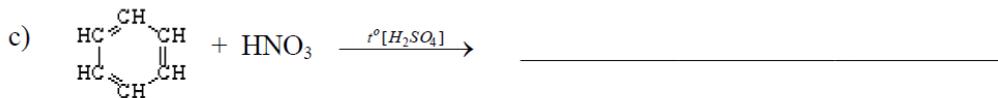
I	II
___ 1. $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH} = \text{CH}_2$	A. Fenol
___ 2. $\text{CH} \equiv \text{CH}$	B. Etenă
___ 3. 	C. 3-metilbut-1-enă
___ 4. 	D. but-1-ină
	E. Etină
	F. Metanal

46. 2012 PRE (SOCIAL)

Solve the problem. During the practical work in the alcohol lamp burning ethanol 4.6 g mass Calculate the volume of oxygen at STP needed for this reaction.

47. 2012 PRE (SOCIAL)

Finish the reactions schemes, using structural formulas of organic substances semidesfășurate:



48. 2015 BAZA (SOCIAL)

Acetic acid (ethanoic) is the best known carboxylic acid.

Characterize the acetic acid (ethanoic) according to the following plan:

1) Semi-developed structural formula

2) Two physical properties:

.....

3) One chemical property (write the reaction equation):

.....

4) One obtaining method (write the reaction equation):

.....

5) One certain field of use:

.....

49. 2015 BAZA (SOCIAL)

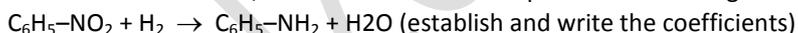
Complete the schemes of proposed reactions with corresponding formulas and coefficients:



50. 2015 BAZA (SOCIAL)

The first artificial dyes of purple and red colours were obtained from aniline in the middle of the nineteenth century.

Solve the problem. Calculate the weight of aniline which is obtained by the interaction of hydrogen with the volume 6.72 L at STP with nitrobenzene, if the chemical reaction proceeds according to the following scheme:



51. 2015 BAZA (SOCIAL)

The compound butan-1-ol is used as raw material in the manufacture of hormones and vitamins.

For compound butan-1-ol:

1) Write the semi-developed structural formula:

.....

2) Write formulas and names of isomers, filling in the blank spaces from the table:

Type of the isomer	Structural formula	Name
The chain isomer		
The isomer of position of functional group		

3) Write the structural formula for an homologue and its name:

.....

52. 2015 BAZA (SOCIAL)

Circle letter T, if the statement is true and letter F if the statement is false:

- 1) T F Synthetic rubber is obtained by the polymerization reaction.
- 2) T F The general formula of alkenes is C_nH_{2n} .
- 3) T F Polyalcohols are identified with copper (II) hydroxide.
- 4) T F Sucrose is monosaccharide.
- 5) T F Soap can be obtained by basic hydrolysis of fats.

53. 2015 BAZA (REAL)

The mixtures of ethanol and ethyl acetate are used as solvents for printing images on various packages. For the packaging used for food products it is recommended to use mixtures with a content of ethyl acetate of 6-8%, for the non-foods products 18-20%.

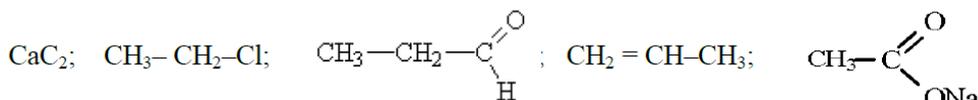
Solve the problem.

A mixture of ethanol and ethyl acetate with the mass of 250 g was treated with a high level of metallic sodium. As a result it was eliminated a gas with volume of 56 L at STP.

- 1) Calculate the mass percent of each component from the mixture.
- 2) Give arguments if this mixture can be used in order to print images on the food packages.

54. 2015 BAZA (REAL)

There are given the compounds:



Write an equation of obtaining reaction for each compound indicated below, with condition that in each case, one of initial substances should be chosen from the proposed row. Use for organic compounds the structural formulas.

- 1) an alkane:
- 2) an alkene:
- 3) an alcohol:
- 4) a carboxylic acid:

55. 2015 BAZA (REAL)

Complete the blank spaces of the table in accordance with the indicated characteristics for the organic compounds

Characteristic of organic compound	Structural formula of compound	Name of compound according to systematic nomenclature
1) It is a homologue of butanal		
2) It is an isomer of 2-methylbut-1-ene		
3) It is used as a monomer to obtain rubbers		

56. 2015 BAZA (REAL)

Encircle the letter T, if the statement is true and the letter F, if it is false.

- 1) T F The substance with composition C_5H_8 belongs to the homologous series of arenes.
- 2) T F The reaction between a carboxylic acid and an alcohol is called the esterification reaction.
- 3) T F In a phenol molecule all of the carbon atoms are sp^2 hybridized.
- 4) T F Amines have acidic properties.
- 5) T F Copper (II) hydroxide serves as a reagent for identification of proteins.

57. 2016 BAZA (REAL)

For the application of the inscriptions on various surfaces (paper, glass, plastic, etc.) are used different types of markers with ink: cyclohexane, ethanol, benzene.

Complete the blank spaces from the proposed sentences:

- I. Cyclohexane belongs to a homologous series with the general formula and contains only carbon atoms in the hybridization state.
- II. Ethanol contains the functional group called, can be identified with, is used for
- III. Benzene can be obtained from by the reaction

58. 2016 BAZA (REAL)

Aminocaproic acid (6-aminohexanoic acid) is an effective component of preparations used for the treatment and prevention of influenza, as they inhibit penetration and reproduction of viruses in the body.

I. Write in the blank spaces of the proposed sentences the letter T, if the sentence is true and the letter F, if it is false.

6-aminohexanoic acid has the molecular formula $C_6H_{13}NO_2$ (.....), possesses amphoteric properties (.....), as a result of polycondensation reaction forms a polysaccharide (.....).

II. Complete the blank spaces of the table for the isomers of 6-aminohexanoic acid.

Type of isomerism	Structural semi-developed formula of an isomer	Name of the isomer according to systematic nomenclature
Chain		
Position		

59. 2016 BAZA (REAL)

There are given the substances:

ethanoic acid, methanal, ethen, phenol, 2-methyl buta-1,3-diene.

Write the equation reaction according to the indicated type, using in each case as the reagent one of the substances from the proposed row. For the organic substances use the semi-developed structure formulas.

- 1) hydrogenation reaction
- 2) substitution reaction
- 3) polymerization reaction
- 4) oxidation reaction

60. 2016 BAZA (REAL)

The solution propan-2-ol with the mass of alcohol not less than 70% ensures delicate cleaning of the phones, printers and monitors without leaving traces on the cleaned surfaces.

Solve the problem. Propene, obtained in the propane dehydrogenation with the volume of 44.8 l (STP) was treated with water with the mass of 54 g.

- a) Calculate the mass of propan-2-ol that can be obtained in this case.
- b) Give arguments by calculations, if the solution with the mass of 150 g, prepared from this mass of alcohol will ensure cleaning of a monitor without leaving traces.

It is given:

Solution:

.....
.....
Answer: a); b)

61. 2016 BAZA (UMAN)

Circle the letter T, if the statement is true and letter F, if it is false:

- 1) T F The general formula of alkenes is C_nH_{2n} .
- 2) T F Phenol contains functional group— NH_2 .
- 3) T F Glycerin belongs to the class of aldehydes.
- 4) T F Synthetic rubber is obtained from the polymerization of butadiene.
- 5) T F Starch can be identified by iodine solution.
- 6) T F Esters are used in the food industry as flavorings

62.2016 BAZA (UMAN)

A. Complete the blank spaces in the table below:

Name of organic compounds	Condensed structural formula	Name of substance
Aldehydes		
	$\begin{array}{c} \text{H}_3\text{C} \quad \text{H} \quad \text{CH}_3 \\ \quad \quad \\ \quad \quad \text{C} \\ \quad \quad \\ \quad \quad \text{CH}_3 \end{array}$	
		Pent-1-yne

B. For compound pent-1-yne:

1) Write the semi-developed structure formula and name of an isomer:

_____ (formula) _____ (name)

2) Write the semi-developed structure formula and name of an homologue:

_____ (formula) _____ (name)

63.2016 BAZA (UMAN)

One of the industrial methods for producing ethanol is the fermentation of glucose.

Solve the problem. Calculate the weight of ethanol obtained by the fermentation of glucose, if as a result of the reaction is released carbon dioxide (IV) with the volume 4,48 l (STP). The chemical reaction proceeds according to the following scheme:

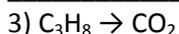
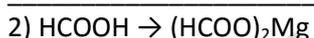
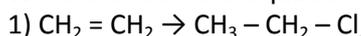
It is given:

Solution:

Answer: _____

64.2016 BAZA (UMAN)

Write the reactions equations, according to the following schemes:

**65.2016 BAZA (UMAN)**

A. It is given the line of organic compounds:



Choose for each characteristics one substance from the proposed line and write its formula in the space reserved:

no	Characteristic of the substance	Chemical formula of the substance
1	It is used for welding and cutting metals	
2	It is the product of the oxidation reaction of the aldehyde	
3	It is used as antiseptic in medicine	
4	It is obtained by the reduction reaction of the nitrobenzene with hydrogen	

B. Write for a substance from the proposed row:

1) A reaction equation which illustrates one chemical property of the substance:

2) one physical property:

66.2016 PRE (UMAN)

Circle T, if the statement is true and letter F if the statement is false.

- 1) T F Fats are glycerol esters of higher carboxylic acids, and
- 2) T F Starch and cellulose are monosaccharides
- 3) T F Benzene can be obtained by trimerization reaction of acetylene
- 4) T F Aniline containing functional group - OH.
- 5) T F Proteins are obtained by polycondensation of alpha-amino acids
- 6) T F Alkynes of general formula is $C_n H_{2n}$

67.2016 PRE (UMAN)

A. Fill in the blanks in the table below:

Group name of organic compound	Condensed structural formula	Name of the substance
amine		
	CH_3CH_2OH	
		But-2-ene

B. Write for but-2-ene

1) Condensed structural formula and name of one of its chain isomer

formula

name

2) Condensed structural formula and name of one of its isomer with respect to position of double bond

formula

name

68.2016 PRE (UMAN)

Write the reactions equations in the spaces according to the given equation

1.



2.



3. $CH_3COOH \rightarrow CH_3COONa$

69.2016 PRE (UMAN)

A group of organic substances is given



Choose for each proposed feature a substance in the series and write in the space reserved its formula:

No	characteristic of substance	Chemical formula of the substance
1.	It is the product of interaction between acid and alcohol	
2.	It is used to obtain synthetic rubber	
3.	It reacted by alcoholic fermentation	
4.	Participate in the dehydrogenation reaction	

B. For a substance in the series given above write :

1) a reaction equation illustrating one of its chemical properties

2) a physical property

70.2016 PRE (REAL)

Nail polish remover solutions containing acetone, ethylene glycol, or ethyl acetate.

Fill in the gaps in the following statements.

I. Ethyl acetate (acetic acid ethyl ester) belonging to homologous series of the general formula..... and homolog of

II. Acetone (propanone) contain functional group named as and obtained from byreaction

III. Ethylene glycol (ethane-1,2-diol) contains carbon atoms in the state of hybridization and can be identified by

71.2016 PRE (REAL)

Some species of dandelion can be used as industrial sources for obtaining natural rubber latex due to the high content of an isomer pentadiene.

I. Notes in the gaps of the statements suggested the letter A if you consider true and letter F, unless:

Penta-1,3-diene has the molecular formula C_5H_{10} (.....) contains two π bonds (.....) and has no positional isomers (.....).

II. Fill in the blanks in the table for penta-1,3-diene isomers

Type of isomerism	Condensed structural formula of the isomer	Name of the isomer
Chain		
Functional group		

72.2016 PRE (REAL)

Given substances are : methanoic acid, benzene, propan-1-ol, ethyne, aniline.

Write a chemical equation as far as the type indicated in each case using reagent as one of the substances proposed in the series. For organic substances use condensed structural formula.

1. hydrogenation

2. nitration.....

3. esterification.....

4. dehydration.....

73.2016 PRE (REAL)

Bromoethane is used in automatic fire extinguishing installations by acting effectively inhibiting the combustion reactions at a concentration of at least 200 g / m^3 .

Solve the problem.

Ethylene which is obtained in dehydrogenation volume of 112 L of ethane at STP was treated with hydrogen bromide with a weight of 324 g.

a) Calculate mass bromoethane produced.

b) Argue that this amount of bromoethane can secure the fire in a laboratory with volume of 10 m^3 .

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