

### Органическая химия. Карточки для тестирования.

**Тема:** Номенклатура органических соединений. Реакции алканов, алкенов, алкинов.

**Задание:**

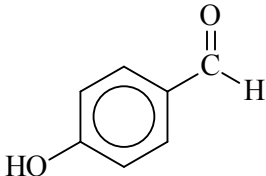
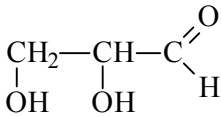
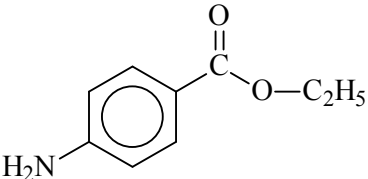
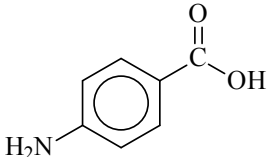
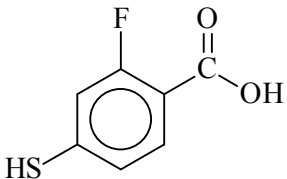
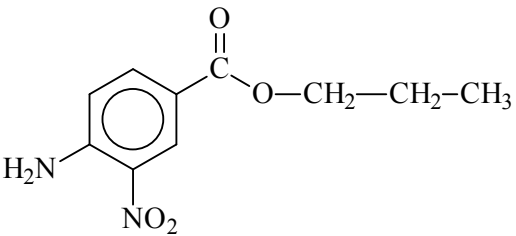
- из предложенной структуры составить название органического соединения согласно номенклатуре ИЮПАК;
- из предложенного названия создать структурную формулу вещества;
- ответить на предложенный вопрос в письменном виде.

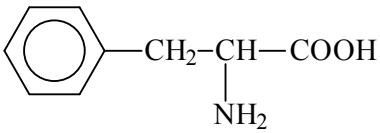
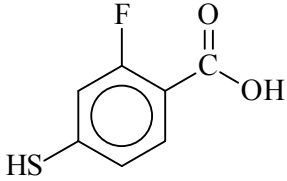
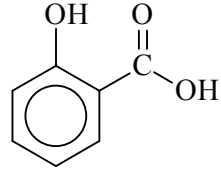
### Organic chemistry. Cards for testing.

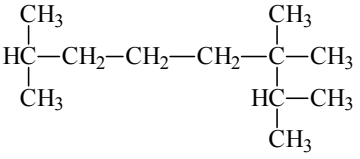
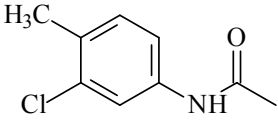
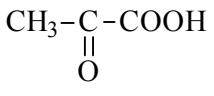
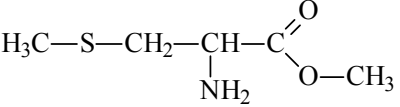
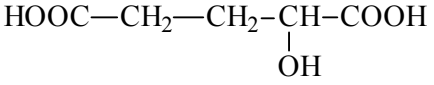
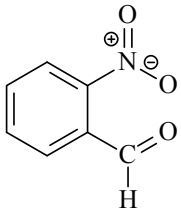
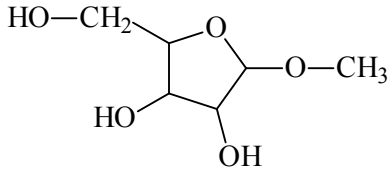
**Theme:** Nomenclature of organic compounds. The reactions of alkanes, alkenes, alkynes.

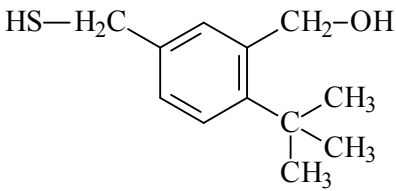
**Task:**

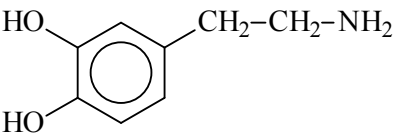
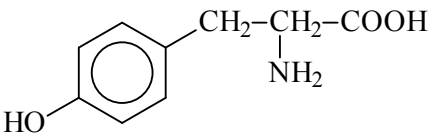
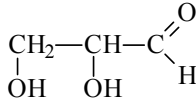
- from the proposed structure create a the name of organic compound according to the nomenclature IUPAC;
- from the proposed names create the structural formula of substance.
- answer the question in writing.

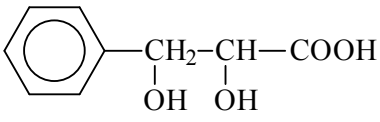
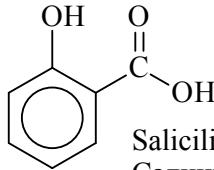
<p>1</p>  <p>2-Chloropropene 2-Хлорпропен</p> <p>Write structural formulae of hydrocarbons: a) 4,4-dimethylpent-2-ene; b) 3-methylpent-1-yne; c) 2,6-dimethylhept-3-yne; g) 2,2,5,5-tetramethylhex-3-yne.</p>	<p>2</p>  <p>1-Hydroxy-2-bromo-4-nitrobenzene 2-Bromo-4-nitrophenol 1-Гидрокси-2-бром-4-нитробензол</p> <p>Write the reactions of addition: a) hydrogen bromide to propene; b) hydrogen chloride to 2,4,4-trimethylpent-2-ene. Name resulting compounds and explain each reaction.</p>
<p>3</p>  <p>2-Бромопентане 2-Бромпентан</p> <p>Why alkenes are more reactive than alkanes?</p>	<p>4</p>  <p>2-Aminoethanol (Glycinol) 2-АМИНОЭТАНОЛ (Коламин)</p> <p>A primary carbon atom is bonded to only 1 other carbon atom. What is a carbon atom bonded to 4 other carbon atoms called?</p>
<p>5</p>  <p>2-Methylpent-2-ene 2-Метилпент-2-ен</p>	<p>6</p>  <p>1-(4-Суанофенил)циклогексане 1-(4-Цианофенил)циклогексан</p>

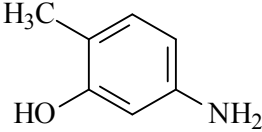
<p>7</p>  <p>4-Bromobutan-2-one 4-Бромбутан-2-он</p> <p>Homologues are not: a) cyclopentane and cyclohexane; b) butene and pentene; c) propane and cyclopropane; g) ethane and hexane. Write structural formulas of these substances.</p>	<p>8</p> $\text{HOOC}-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{COOH}$ <p>2-(4-Fluorophenyl)benzoic acid 2-(4-Фторфенил)бензойная кислота</p> <p>Write structural formulas of two closest homologues of heptane having in the molecule: a) two tertiary carbon atoms; b) one quaternary carbon atom.</p>
<p>9</p> $\text{H}_3\text{C}-\underset{\text{Cl}}{\text{CH}}-\text{CH}_2-\text{OH}$ <p>4-Nitropentanoic acid 4-Нитропентановая кислота</p> <p>Write the equations of reactions that can be used to carry out the transformation: <b>1-Bromopropane</b> → <b>2-Bromopropane</b></p>	<p>10</p> $\text{H}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{OH}$ <p>2-Oxobutyric acid 2-Оксобутановая кислота</p> <p>What is the formula of the carboxylic acid from the sodium salt of which isobutane can be obtained? Create a the reaction equation.</p>
<p>11</p>  <p>2-Methylpent-2-ene 2-Метилпент-2-ен</p> <p>Perform the transformation and name all the intermediate products of the reactions: 1-bromo-3-methylbutane → 2-methylbut-2-ene.</p>	<p>12</p>  <p>2-Methyl-5-ethylhept-3-yne 2-Метил-5-этилгепт-3-ин</p> <p>What can be reactions to distinguish pentane, pent-1-ene and pent-1-yne? Write the reaction equations.</p>
<p>13</p> $\text{H}_3\text{C}-\underset{\text{Cl}}{\text{CH}}-\text{CH}_2-\text{OH}$ <p>4-Nitropentanoic acid 4-Нитропентановая кислота</p> <p>There are several constitutional isomers having Mol. formula <math>\text{C}_4\text{H}_{10}\text{O}</math>. Write formulae with correct IUPAC names for of these isomers.</p>	<p>14</p> $\text{H}_2\text{C}-\underset{\text{Cl}}{\overset{\text{OH}}{\text{CH}}}-\text{CH}_2-\text{OH}$ <p>2,3-Dimethylbut-2-ene 2,3-Диметилбут-2-ен</p> <p>Write a formula 2,2,5,5-tetramethylhexane. Write a formula its isomer having as substituents on the main chain only ethyl radicals.</p>

<p>15</p>  <p>2-Methyl-2-phenylbutane 2-Метил-2-фенилбутан</p> <p>Create structural formulas of the compounds: a) 1,3-dimethyl-2-ethylcyclopentane; b) 1-methyl-4-isopropylcyclohexane (menthane); c) 1,2-dimethylcyclohex-1-ene; g) 1-methylcyclopenta-1,3-diene.</p>	<p>16</p>  <p>2-methyl-3-chloro-3-ethylhexane 2-Метил-3-хлор-3-этилгексан</p> <p>Create structural formulas and name according to IUPAC nomenclature the isomers of cycloalkanes with Mol. formula <math>C_6H_{12}</math> which contain three-membered ring (6 isomers).</p>
<p>17</p>  <p>2,4-Dinitrofluorobenzene 2,4-Динитрофторбензол</p> <p>Write a formula 2,2,5,5-tetramethylhexane. Write a formula its isomer having as substituents on the main chain only ethyl radicals.</p>	<p>18</p>  <p>Chloroethylene (Vinyl chloride) Хлорэтилен (винил хлорид)</p> <p>Write the reactions and name the product obtained by fusion with alkali the following acids: <b>a) <math>CH_3CH_2COOH</math>; b) <math>(CH_3)_2CHCOOH</math></b></p>
<p>19</p> <p><math>HOOC-CH_2-CH_2-COOH</math></p> <p>Ethyl 4-aminobenzoate Этил 4-аминобензоат Этиловый эфир 4-аминобензойной кислоты</p> <p>What is the formula of the carboxylic acid from the sodium salt of which isobutane can be obtained? Create a the reaction equation.</p>	<p>20</p>  <p>1-Isopropyl-3,5-dimethylbenzene 1-Изопропил-3,5-диметилбензол</p> <p>Write the equations of reactions that can be used to carry out the transformation: <b>1-Bromopropane <math>\rightarrow</math> 2-Bromopropane</b></p>
<p>21</p>  <p>2,3,3,6,7-pentamethyloctane 2,3,3,6,7-пентаметилоктан</p> <p>What can be reactions to distinguish pentane, pent-1-ene and pent-1-yne? Write the reaction equations.</p>	<p>22</p>  <p>2-Butanone 2-Бутанон (Метилэтилкетон)</p> <p>Perform the transformation and name all the intermediate products of the reactions: 1-bromo-3-methylbutane <math>\rightarrow</math> 2-methylbut-2-ene.</p>

<p>23</p> $\text{HOOC}-\text{CH}_2-\text{CH}_2-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{COOH}$ <p>(2-(<i>tert</i>-Butyl)-5-(mercaptomethyl)phenyl)-methanol (2-(<i>трет</i>-Бутил)-5-(меркаптометил)-фенил)метанол</p> <p>Write the equations of reactions of isopropyl acetylene with: a) bromine water; b) HCl; c) HCN; g) with water in the presence of mercury salts; d) with copper monochloride.</p>	<p>24</p>  <p>2-Гидрохупропане-1,2,3-трикарбоновая кислота 2-Гидроксипропан-1,2,3-трикарбоновая кислота (Лимонная кислота)</p> <p>What hydrocarbons produced by the action of sodium metal on halogenated derivatives in conditions of Wurtz synthesis: a) 2-methyl-2-iodopropane; b) 2-bromobutane?</p>
<p>25</p> $\text{HOOC}-\text{CH}_2-\text{CH}_2-\underset{\text{NH}_2}{\text{CH}}-\text{COOH}$ <p>4-(Methylthio)-2-oxobutanoic acid 4-(Метилтио)-2-оксобутановая кислота</p> <p>Create a equation for the reaction obtaining from the corresponding halogenated derivatives: a) methylcyclopropane; b) 1,2-dimethylcyclobutane.</p>	<p>26</p> $\text{HOOC}-\text{CH}_2-\underset{\text{COOH}}{\underset{\text{OH}}{\text{C}}}-\text{CH}_2-\text{COOH}$ <p>2,2-Dimethylhexane 2,2-Диметилгексан</p> <p>Write the reaction equations that can be used to carry out the transformation: 1-Bromobutane → 2-Bromobutane</p>
<p>27</p> $\text{HOOC}-\underset{\text{H}}{\underset{\parallel}{\text{C}}}-\underset{\text{H}}{\text{C}}-\text{COOH}$ <p>3-Methyl-3-nitropentane 3-Метил-3-нитропентан</p>	<p>28</p> $\text{H}_3\text{C}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\underset{\text{CH}_2}{\text{CH}}-\text{CH}_2-\underset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{CH}_3$ <p>4-Isopropyl-2-methylheptane 4-Изопропил-2-метилгептан</p>
<p>29</p> $\text{H}_3\text{C}-\underset{\text{CH}_2}{\underset{\text{CH}_3}{\text{CH}}}-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_3$ <p>2-Гидроху-3-аминобутирική кислота 2-Гидрокси-3-аминобутановая кислота</p>	<p>30</p> $\text{H}_3\text{C}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}=\text{O}$ <p>Ethyl 3-hydroxy-2-aminobutyrate Этил 2-амино-3-гидоксибутират</p> <p>A primary carbon atom is bonded to only 1 other carbon atom. What is a carbon atom bonded to 4 distinct groups called?</p>

<p>31</p>  <p>2-oxo-3-phenylpropanamide 2-Оксо-3-фенилпропанамид</p> <p>Write the reaction equations that can be used to carry out the transformation: 1-Bromobutane → 2-Bromobutane</p>	<p>32</p>  <p>3-Оксо-4-фенилбутанамид 3-Оксо-4-фенилбутанамид</p> <p>Which of the following compounds react with ammonia solution of silver oxide: a) ethylacetylene; b) 2-butyne; c) 4-methylpent-2-yne; g) methylisopropylacetylene; d) 3,3-dimethylpent-1-yne?</p>
<p>33</p> <p>Продолжите уравнение реакции: Continue reaction:</p> $\text{CH}_3\text{-CH}_2\text{-CH=CH}_2 + \text{HI} \longrightarrow$ <p>2-Chloropropanol 2-Хлорпропанол</p> <p>Write structural formula the geometric isomers of 1-methyl-2-ethylcyclobutane. Name isomers according to IUPAC nomenclature.</p>	<p>34</p>  <p>1-Hydroxy-2-bromo-4-nitrobenzene 2-Bromo-4-nitrophenol 1-Гидрокси-2-бром-4-нитробензол</p> <p>Write the empirical formula of heptane. Output all (nine) of the isomeric hydrocarbons with this Mol. formula. Name each isomer according to IUPAC nomenclature.</p>
<p>35</p> <p>Назовите тип разрыва химической связи: Identify type of chemical bond fission:</p> $\text{A} \text{---} \text{B} \longrightarrow \text{A}^{\oplus} + \text{B}^{\ominus}$ <p>4-Bromopentanol-1 4-Бромпентанол-1</p> <p>Perform the transformation and name all the intermediate products of the reactions: 1-bromo-3-methylbutane → 2-methylbut-2-ene.</p>	<p>36</p> <p>Назовите тип разрыва химической связи: Identify type of chemical bond fission:</p> $\text{A} \text{---} \text{B} \longrightarrow \text{A}^{\bullet} + \text{B}^{\bullet}$ <p>2-Aminoethanol 2-АМИНОЭТАНОЛ (Коламин)</p> <p>What can be reactions to distinguish pentane, pent-1-ene and pent-1-yne? Write the reaction equations.</p>
<p>37</p> <p>Продолжите уравнение реакции: Continue reaction:</p> $\text{CH}_2=\text{CH-CH}_3 + \text{H}_2\text{O} \longrightarrow$ <p>2-Methylpent-3-en-1-ol and its isomers. 2-Метилпент-3-ен-1-ол и его изомеры.</p>	<p>38</p> <p>Продолжите уравнение реакции: Continue reaction:</p> $\text{C}_2\text{H}_6 + \text{Cl}_2 \longrightarrow$ <p>2-(4-Цианофенил)циклогексанол and its isomers. 2-(4-Цианофенил)циклогексанол и его изомеры.</p>

<p>39</p>  <p>4-Bromobutan-2-one 4-Бромбутан-2-он</p> <p>What are the isomers of: a) ethylacetate; b) pentanol; c) ethylbenzene; d) C<sub>7</sub>H<sub>12</sub> ?</p>	<p>40</p> $\text{HOOC}-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{COOH}$ <p>Назовите тип разрыва химической связи: Identify type of chemical bond fission:</p> $\text{A} - \text{B} \longrightarrow \text{A}^{\ominus} + \text{B}^{\oplus}$ <p>– What is stereoisomerism?</p>
<p>41</p> $\text{H}_3\text{C}-\underset{\text{Cl}}{\text{CH}}-\text{CH}_2-\text{OH}$ <p>4-Nitropentanoic acid 4-Нитропентановая кислота</p> <p>Write the empirical formula of heptane. Output all (nine) of the isomeric hydrocarbons with this Mol. formula. Name each isomer according to IUPAC nomenclature.</p>	<p>42</p> $\text{H}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{OH}$ <p>2-Oxobutyric acid 2-Оксобутановая кислота</p> <p>Write and explain the hydration reaction of a) 2-methylprop-1-ene; b) 2-methylpent-2-ene; c) 4-methylpent-2-ene. Specify the conditions under which these reactions occur. What are the resulting compounds?</p>
<p>43</p> <p>Продолжите уравнение реакции: Continue reaction:</p> $\text{C}_2\text{H}_6 + \text{Cl}_2 \longrightarrow$ <p>4-Methylpent-2-en-1-ol 4-Метилпент-2-ен-1-ол</p> <p>What are the isomers of: a) ethanol; b) propanol; c) butanol; d) aspirin ?</p>	<p>44</p>  <p>Salicylic acid Салициловая кислота</p> <p>2-Methyl-5-ethylhept-3-ene 2-Метил-5-этилгепт-3-ин</p> <p>What are the isomers of: a) acetone; b) 2-methylpropanol; c) butanone; d) C<sub>5</sub>H<sub>10</sub> ?</p>
<p>45</p> $\text{H}_3\text{C}-\underset{\text{Cl}}{\text{CH}}-\text{CH}_2-\text{OH}$ <p>4-Nitropentanoic acid 4-Нитропентановая кислота</p> <p>Which of the following compounds will exhibit geometrical isomerism: a) 1-Phenyl-2-butene; b) 3-Phenyl-1-butene; c) 2-Phenyl-1-butene; (d) 1,1-Diphenyl-1-propene?</p>	<p>46</p> $\text{H}_2\text{C}-\underset{\text{Cl}}{\overset{\text{OH}}{\text{C}}}-\text{CH}-\text{CH}_2-\text{OH}$ <p>2,3-Dimethylbut-2-ene 2,3-Диметилбут-2-ен</p> <p>What is the mechanism of electrophilic addition reaction of alkenes?</p>

<p>47</p> <p>Назовите типы химических реакций: Identify type of chemical reaction:</p> <p>S<sub>R</sub> A<sub>N</sub> E<sub>E</sub></p> <p>2-Methyl-2-phenylbutane and its isomers. 2-Метил-2-фенилбутан и его изомеры.</p>	<p>48</p>  <p>2-methyl-3-chloro-3-ethylhexane 2-Метил-3-хлор-3-этилгексан</p>
<p>49</p> <p>Продолжите уравнение реакции: Continue reaction:</p> $\text{HOOC}-\overset{\text{H}}{\underset{\text{H}}{\text{C}}}=\text{C}-\text{COOH} + \text{H}_2 \longrightarrow$ <p>2,4-Dinitro-5-fluorophenol and its isomers. 2,4-Динитро-5-фторфенол и его изомеры.</p> <p>What are endothermic and exothermic reactions?</p>	<p>50</p> <p>Назовите типы химических реакций: Identify type of chemical reaction:</p> <p>S<sub>N</sub>    A<sub>R</sub>    E<sub>N</sub></p> <p>Chloroethylene Хлорэтилен (винил хлорид)</p> <p>How many carbon atoms must be present in an alkane for the molecule to show structural isomerism?</p>
<p>51</p> $\text{HOOC}-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{COOH}$ <p>Ethyl 4-aminobenzoate Этил 4-аминобензоат Этиловый эфир 4-аминобензойной кислоты</p> <p>What is the general term used to describe an alkane in a ring structure?</p>	<p>52</p> $\text{HOOC}-\text{CH}_2-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{COOH}$ <p>2-Isopropyl-3,5-dimethylphenol 2-Изопропил-3,5-диметилфенол</p> <p>How many constitutional isomers has C<sub>5</sub>H<sub>12</sub>?</p>
<p>53</p> <p>Назовите типы химических реакций: Identify type of chemical reaction:</p> <p>S<sub>E</sub> A<sub>R</sub> E<sub>N</sub></p> <p>2,3,3,6,7-pentamethyloctanol 2,3,3,6,7-пентаметилоктанол</p> <p>When ethene (ethylene) undergoes a chemical reaction with water in the presence of sulfuric acid, it produces a compound (A). What exactly is the compound (A)?</p>	<p>54</p> <p>Identify what class of organic compounds has the following general formulae: Определить к какому классу относятся следующие общие формулы:</p> <p>C<sub>n</sub>H<sub>2n+1</sub>OH    C<sub>n</sub>H<sub>2n+2</sub></p> <p>C<sub>n</sub>H<sub>n+2</sub>    C<sub>n</sub>H<sub>2n</sub></p> <p>2-Butanone and its isomers. 2-Бутанон (Метилэтилкетон) и его изомеры.</p> <p>When ethanol (ethyl alcohol) undergoes a reaction with acetic acid, it produces an ester and a compound (B). What is the name of the compound (B)?</p>

<p>55</p> $\text{HOOC}-\text{CH}_2-\text{CH}_2-\underset{\begin{array}{c} \parallel \\ \text{O} \end{array}}{\text{C}}-\text{COOH}$ <p>(2-(<i>tert</i>-Butyl)-5-(mercaptomethyl)phenyl)-methanol (2-(<i>трет</i>-Бутил)-5-(меркаптометил)-фенил)метанол</p>	<p>56</p> <p>Какое из нижеследующих соединений будет реагировать с метаном? Напишите уравнение реакции. Which of the following would be most likely to react with methane? Write corresponding equation. (CH<sub>3</sub>)<sub>2</sub>CO    C<sub>6</sub>H<sub>6</sub>    Cl<sub>2</sub>    CH<sub>3</sub>OH</p> <p>2-Hydroxypropane-1,2,3-tricarboxylic acid 2-Гидроксипропан-1,2,3-трикарбоновая кислота (Лимонная кислота)</p>
<p>57</p> <p>As cycloalkanes are a homologous series, what is the general formula for a cyclic alkane? Поскольку циклические алканы образуют гомологический ряд укажите общую формулу циклоалканов: A) C<sub>n</sub>H<sub>2n-2</sub>    B) C<sub>n</sub>H<sub>n</sub>    C) C<sub>n</sub>H<sub>2n+2</sub>    D) C<sub>n</sub>H<sub>2n</sub></p> <p>How many distinct groups must a carbon have to be chiral? Write example structures and names of compounds.</p>	<p>58</p> <p>Составьте уравнения реакций, с помощью которых можно осуществить превращения: <b>CH<sub>4</sub> =&gt; ацетилен =&gt; CH<sub>3</sub>CHO</b></p> <p>Create schemes for following transformation: <b>Methane=&gt; acetylene =&gt; Acetaldehyde</b></p> <p><i>Para</i>-Nitrobenzoic acid and its isomers. <i>пара</i>-Нитробензойная кислота и ее изомеры</p>
<p>59</p> <p>Продолжите уравнение реакции: Continue reaction:</p> $\text{HOOC}-\underset{\begin{array}{c} \text{H} \\   \end{array}}{\text{C}}=\underset{\begin{array}{c} \text{H} \\   \end{array}}{\text{C}}-\text{COOH} + \text{H}_2\text{O} \rightarrow$ <p>2-Methyl-3-nitropentanol 2-Метил-3-нитропентанол</p> <p>Write structural formulae of geometrical isomers of 1-methyl-2-ethylcyclobutane. Name the isomers.</p>	<p>60</p> <p>Укажите наименьшее число атомов углерода в молекуле алкана при котором возможно образование изомеров: How many carbon atoms must be present in an alkane for the molecule to show structural isomerism?</p> <p>A) 3    B) 6    C) 5    D) 4</p> <p>4-Isopropyl-2-methylheptanol 4-Изопропил-2-метилгептанол</p> <p>Write structural formulae of isomers of 1,1-dimethyl-2-ethylcyclopentane. Name the isomers.</p>
<p>61</p> <p>What is the general term used to describe an alkane in a ring structure? Каким термином описываются алканы циклической структуры: A) Циклоид    Alkaneround B) Кольцевой алкан    Ringalkane C) Циклоалкан    Cycloalkane D) Алканоид    Alkanecyclan</p> <p>2-Hydroxy-3-aminobutyric acid and its isomers. 2-Гидрокси-3-аминобутановая кислота и ее изомеры.</p>	<p>62</p> <p>Составьте уравнения реакций, с помощью которых можно осуществить превращения: Метан =&gt; хлорметан =&gt; метанол =&gt; формальдегид</p> <p>Create schemes for following transformation: Methane=&gt;Chlorometane=&gt;Methanol=&gt;Formaldehyde</p> <p>Ethyl 3-hydroxy-2-aminobutyrate Этил 2-амино-3-гидроксибутират</p> <p>Write the reaction equations obtaining of the relevant dihalogen derivatives: a) methylcyclopropane; b) 1,2-dimethylcyclobutane.</p>



<p>63</p> <p>Из скольких изомеров может состоять алкан C<sub>5</sub>H<sub>12</sub>? C<sub>5</sub>H<sub>12</sub> has how many constitutional isomers? Draw all of the isomeric hydrocarbons with this Mol. formula. Name each isomer according to IUPAC nomenclature.</p> <p>2-Охо-3-phenylpropanol and its isomers. 2-Оксо-3-фенилпропанол и его изомеры.</p>	<p>64</p> <p>Which of the following would be most likely to react with methane? Какое из приведенных веществ будет реагировать с метаном?</p> <p>A) (CH<sub>3</sub>)<sub>2</sub>CO B) C<sub>6</sub>H<sub>6</sub> C) Cl<sub>2</sub> D) CH<sub>3</sub>OH Write the reaction.</p> <p>3-Охо-4-phenylbutandiol-1,2 and its isomers. 3-Оксо-4-фенилбутандиол-1,2 и его изомеры.</p>
<p>65</p> $\text{HOOC}-\text{CH}_2-\text{CH}_2-\underset{\text{NH}_2}{\text{CH}}-\text{COOH}$ <p>4-(Methylthio)-2-oxobutanoic acid 4-(Метилтио)-2-оксобутановая кислота</p> <p>Obtain cyclohexene from cyclohexane and write the equation reactions of cyclohexene: a) with one molecule of chlorine; b) with a solution of potassium permanganate.</p>	<p>66</p> <p>Write empirical and structural formula of methane, ethane and propane. How many 1°, 2°, 3° &amp; 4° carbon atoms has the alkane: <b>CH<sub>3</sub>CH<sub>2</sub>C(CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>CH(CH<sub>3</sub>)<sub>2</sub></b> ?</p> <p>Write the empirical formula of heptane. Draw all (nine) of the isomeric hydrocarbons with this Mol. formula. Name each isomer according to IUPAC nomenclature.</p>
<p>67</p> $\text{HOOC}-\text{CH}_2-\underset{\text{COOH}}{\overset{\text{OH}}{\text{C}}}-\text{CH}_2-\text{COOH}$ <p>2,2-Dimethylhexane 2,2-Диметилгексан</p> <p>Write the reactions of interaction of alpha pinene: a) with one molecule of chlorine; b) with hydrogen bromide.</p>	<p>68</p> <p>Write empirical and structural formulas: a) propane; b) butane; c) isobutane. The IUPAC name for <b>(CH<sub>3</sub>)<sub>2</sub>CHCH(CH<sub>3</sub>)CH<sub>2</sub>CH=CH<sub>2</sub></b> is ...</p> <p>Write empirical and structural formulae of the following hydrocarbons: a) 2,2-dimethylhexane; b) 2,3-dimethyl-3-ethylhexane; a) 2,3,4-trimethylpentane; g) 2,5-dimethyl-3,3-diethylhexane; d) 2,2,3,4-tetramethylhexane; e) 2,4,4,5-tetraethylheptane.</p>
<p>69</p> <p>Write the structural formulas of all the isomers pentane and name each isomer according to IUPAC nomenclature. Underline in formulas primary, secondary, tertiary and quaternary carbon atoms, respectively, with one, two, three and four dashes.</p> <p>Write the serial reaction of chlorination of methane, showing a chain free radical mechanism of this reaction.</p>	<p>70</p> <p>Write and explain the addition reaction in presence of concentrated sulfuric acid for hydrocarbons: a) ethene; b) 2-methyl-2-butene. What are the products of the reaction? Name each compound according to IUPAC nomenclature.</p> <p>Write scheme of polymerization: a) propylene; b) 4-methylpent-1-ene. What are the name of resulting polymers? What is differences in the structures of their chains? Specify the polymerization conditions for mentioned hydrocarbons.</p>

<p>71</p> <p>Write and explain the addition reaction in presence of concentrated sulfuric acid for hydrocarbons: a) ethene; b) 2-methyl-2-butene. What are the products of the reaction? Name each compound according to IUPAC nomenclature.</p> <p>What alkenes can be prepared by dehydrogenation of: a) 2-methylbutane; b) n-butane? Write the reactions and name derived hydrocarbons according to IUPAC nomenclature.</p>	<p>72</p> <p>For the following ethylene hydrocarbons write Ozone oxidation scheme with the disintegration of the molecules at the double bond location: a) hex-3-ene; b) 2-methylpent-2-ene; c) 3-methylpent-2-ene. Name each compound according to IUPAC nomenclature.</p> <p>Write structural formulas of the isomeric hydrocarbons with Mol. formula <math>C_8H_{18}</math> and with six carbon atoms in the main chain. Name them according to IUPAC nomenclature.</p>
<p>73</p> <p>What chlorinated derivatives can be obtained by substituting one hydrogen atom by chlorine in compds: a) Propane; b) n-Butane; c) Isobutane; d) 2-Methylbutane? Write reaction schemes of chlorination. Specify the reaction conditions. Name monochloro derivatives formed according to IUPAC nomenclature.</p> <p>Write empirical formulas: a) pentene; b) octene. Write all relevant isomers. Name them according to IUPAC nomenclature.</p>	<p>74</p> <p>What alkenes can be prepared by dehydrogenation of: a) 2-methylbutane; b) n-butane? Write the reactions and name derived hydrocarbons according to IUPAC nomenclature.</p> <p>Write a reaction schemes of alkenes producing from halogen derivatives: a) 3-chlorohexane; b) 2-chloropentane; c) 3-chloropentane. In which case, we should expect the formation of a mixture of isomeric alkenes and why? Name produced hydrocarbons.</p>
<p>75</p> <p>Write the reactions under the action of a single molecule of <math>Br_2</math> on: a) cyclopropane; b) cyclopentene; c) cycloheptane; d) 1,3-cyclohexadiene. Explain feature of the reaction in the case of (d).</p> <p>Write a dehydrogenation reaction (with subtraction of one molecule of hydrogen) for: a) ethane; b) isobutane; c) butane; d) 2-methylbutane.</p>	<p>76</p> <p>What hydrocarbons produced in the Wurtz synthesis if sodium metal will act on a mixture of alkyl halides of 2-iodopropane, and 2-methyl-2-iodobutane? Write a reaction scheme and name the resulting hydrocarbons according to IUPAC nomenclature.</p> <p>Write structural formulas of hydrocarbons: a) 3,4-dimethylhex-3-ene; b) 2-methyl-3-ethylpent-2-ene. Specify hydrocarbons, which can be geometric isomers. Write a formula corresponding geometric isomers and name them according to IUPAC nomenclature.</p>
<p>77</p> <p>What is the essence of hydrocarbon cracking? Write reaction schemes possible to form the cracking products: a) n-butane; b) n-hexane.</p> <p>From which bromo or iodo derivatives the following hydrocarbons can be prepared by the Wurtz reaction: a) 4,5-dimethyloctane; b) 2,3,4,5-tetramethylhexane; c) 3,3,4,4-tetramethylhexane; g) octane? Write a reaction scheme. Name starting haloalkanes according to IUPAC nomenclature.</p>	<p>78</p> <p>Write structural formulas of hydrocarbons: a) 2,5-dimethyl-2-hexene; b) 2,3-dimethyl-1-pentene. Specify hydrocarbons, which can be geometric isomers. Explain why for some of the above compounds, geometric isomerism is not possible.</p> <p>Write reaction schemes and select conditions for the hydrogenation following hydrocarbons: a) 2-methylpent-2-ene; b) 2,4-dimethylpent-2-ene; c) 2,4-dimethylhex-3-ene. Name formed hydrocarbons.</p>