

No.	Items	Score																												
		1	2																											
1	<p>The cornmeal, from which polenta is prepared, contains vitamins, macro- and microelements, such as: <i>Na, P, Ca, C, Zn, Si</i>.</p> <p>Choose <i>an</i> element for each characteristic from the above proposed and write its chemical symbol in the space reserved.</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Characteristic of element</th> <th>Chemical symbol</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>It is situated in the 4<sup>th</sup> period, the main subgroup</td> <td></td> </tr> <tr> <td>2</td> <td>Contains in the nucleus 14 neutrons</td> <td></td> </tr> <tr> <td>3</td> <td>Has the spread of electrons on energetic levels: 2ē 8ē 18ē 2ē</td> <td></td> </tr> <tr> <td>4</td> <td>Shows in compounds the valency III and V</td> <td></td> </tr> <tr> <td>5</td> <td>Forms a higher hydroxide that has the composition H<sub>3</sub>EO<sub>4</sub></td> <td></td> </tr> <tr> <td>6</td> <td>The element's higher hydroxide is an alkaline base</td> <td></td> </tr> <tr> <td>7</td> <td>Forms a volatile compound with the hydrogen that has the composition EH<sub>4</sub></td> <td></td> </tr> <tr> <td>8</td> <td>Higher oxide is used for gassing the water</td> <td></td> </tr> </tbody> </table>	No.	Characteristic of element	Chemical symbol	1	It is situated in the 4 <sup>th</sup> period, the main subgroup		2	Contains in the nucleus 14 neutrons		3	Has the spread of electrons on energetic levels: 2ē 8ē 18ē 2ē		4	Shows in compounds the valency III and V		5	Forms a higher hydroxide that has the composition H <sub>3</sub> EO <sub>4</sub>		6	The element's higher hydroxide is an alkaline base		7	Forms a volatile compound with the hydrogen that has the composition EH <sub>4</sub>		8	Higher oxide is used for gassing the water		L	L
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2	<p>The Republic of Moldova has a rich spectrum of mineral waters that have unique properties and exert beneficial effects on the body. They contain many chemical elements, such as: <i>Ca, N, Fe, Cl, H</i>.</p> <p><b>I.</b> Using <i>only</i> the proposed chemical elements, make up and write in the space reserved the chemical formula of a substance corresponding to each type of chemical bond:</p> <p>a) nonpolar covalent bond _____</p> <p>b) polar covalent bond _____</p> <p>c) ionic bond _____</p> <p>d) metal bond _____</p> <p><b>II.</b> Write a reaction equation of a obtaining for the substance with a <i>polar covalent bond</i>: _____</p> <p><b>III.</b> Write two physical properties for the substance with a <i>metal bond</i>:</p> <p>a) _____, b) _____</p>	L	L																											
		0	0																											
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3	<p><i>Potassium phosphate</i> is used as a catalyst to obtain biodiesel from natural fats and used frying oils. Write the equations of three chemical reactions for the production of <i>potassium phosphate</i> according to the proposed schemes using only the substances from the line: <i>K, K<sub>2</sub>O, H<sub>3</sub>PO<sub>4</sub>, KOH</i>.</p> <p>1) <i>Base + acid</i></p> <p>_____</p> <p>2) <i>Basic oxide + acid</i></p> <p>_____</p> <p>3) <i>Metal + acid</i></p> <p>_____</p>	L	L																											
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<p><b>6</b></p>	<p>Choose and write in the space reserved below, the word from the brackets that correctly completes each of the statements:</p> <p>1) The number of electrons on the last energy level for the elements of the main subgroups can be determined by the number of the ..... in the periodic table.   (group / period / element )</p> <p>2) In the food industry as a preservative is used .....   (SO<sub>2</sub> / SiO<sub>2</sub> / P<sub>2</sub>O<sub>5</sub>)</p> <p>3) In alkaline base solutions the pH is ..... and the methyl orange turns .....   (higher than 7 / less than 7 / equal to 7)   red / yellow / blue)</p> <p>4) 300 g of a solution with a mass fraction of 20% contains .....   (60 g / 30 g / 15 g)</p> <p>of a dissolved substance and ..... of water.   (270 g / 240 g / 285 g)</p> <p>5) At the interaction of ammonia with sulfuric acid, the substance ..... is formed.   (NH<sub>4</sub>Cl / (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> / (NH<sub>4</sub>)<sub>2</sub>S)</p> <p>6) In the line F-Cl-Br, the non-metallic properties .....   (increase / decrease / does not change)</p>	<table border="1"> <tr><td>L</td></tr> <tr><td>0</td></tr> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr><td>7</td></tr> <tr><td>8</td></tr> </table>	L	0	1	2	3	4	5	6	7	8	<table border="1"> <tr><td>L</td></tr> <tr><td>0</td></tr> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr><td>7</td></tr> <tr><td>8</td></tr> </table>	L	0	1	2	3	4	5	6	7	8											
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<p><b>7</b></p>	<p><i>Magnesium hydroxide</i> is part of the medicinal preparations that reduce the acidity of gastric juice.</p> <p><b>I.</b> Complete the blanks spaces in the table below for the substances at the interaction of which the <i>magnesium hydroxide</i> is formed:</p> <table border="1" data-bbox="199 996 1332 1187"> <thead> <tr> <th>Formula of the substance</th> <th>Name of substance</th> <th>Dissociation reaction equation</th> </tr> </thead> <tbody> <tr> <td>Mg(NO<sub>3</sub>)<sub>2</sub></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Sodium hydroxide</td> <td></td> </tr> </tbody> </table> <p><b>II.</b> Using the solubility table and formulas of the proposed substances, write the reaction equation of obtaining the <i>magnesium hydroxide</i> in molecular form (ME), completed ionic (CEI) and reduced ionic (RIE).</p> <p>_____ (ME)</p> <p>_____ (CEI)</p> <p>_____ (RIE)</p>	Formula of the substance	Name of substance	Dissociation reaction equation	Mg(NO <sub>3</sub> ) <sub>2</sub>				Sodium hydroxide		<table border="1"> <tr><td>L</td></tr> <tr><td>0</td></tr> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr><td>7</td></tr> <tr><td>8</td></tr> <tr><td>9</td></tr> </table>	L	0	1	2	3	4	5	6	7	8	9	<table border="1"> <tr><td>L</td></tr> <tr><td>0</td></tr> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr><td>7</td></tr> <tr><td>8</td></tr> <tr><td>9</td></tr> </table>	L	0	1	2	3	4	5	6	7	8	9
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<p><b>8</b></p>	<p>Circle the letter <b>T</b>, if the statement is true and the letter <b>F</b>, if it is false.</p> <p>1) <b>T F</b> The general formula of aldehydes is C<sub>n</sub>H<sub>2n</sub>O<sub>2</sub>.</p> <p>2) <b>T F</b> Synthetic rubber is obtained by the polymerization of buta-1,3-diene.</p> <p>3) <b>T F</b> Fats are used in the production of soaps.</p> <p>4) <b>T F</b> Starch dissolves well in water.</p> <p>5) <b>T F</b> Protein denaturation occurs under the influence of high temperatures.</p> <p>6) <b>T F</b> Ethylene glycol can be identified with copper (II) hydroxide.</p> <p>7) <b>T F</b> Phenol interacts with alkaline bases.</p> <p>8) <b>T F</b> Alkenes are characterized by substitution reactions.</p>	<table border="1"> <tr><td>L</td></tr> <tr><td>0</td></tr> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr><td>7</td></tr> <tr><td>8</td></tr> </table>	L	0	1	2	3	4	5	6	7	8	<table border="1"> <tr><td>L</td></tr> <tr><td>0</td></tr> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr><td>7</td></tr> <tr><td>8</td></tr> </table>	L	0	1	2	3	4	5	6	7	8											
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<b>9</b>	<b>I. Complete the blank spaces of the table:</b>			L	L
	<i>General formula</i>	<i>Structural semi-developed formula of the substance</i>	<i>Name of substance</i>	0	0
	$C_nH_{2n}$			1	1
		$CH_3-CH_2-CH_2-CH_2-OH$		2	2
			2,2-dimethylpropane	3	3
			4	4	
			5	5	
			6	6	
			7	7	
			8	8	
			9	9	
			10	10	
	<b>II. Write the structural semi-developed formula and the name of an <i>isomer</i> for the the substance <math>CH_3-CH_2-CH_2-CH_2-OH</math>:</b>  <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">_____</div> <div style="text-align: center;">_____</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="text-align: center;"><i>(formula)</i></div> <div style="text-align: center;"><i>(name)</i></div> </div>				
	<b>III. Write the structural semi-developed formula and the name of a <i>homologue</i> for the substance 2,2-dimethylpropane:</b>  <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">_____</div> <div style="text-align: center;">_____</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="text-align: center;"><i>(formula)</i></div> <div style="text-align: center;"><i>(name)</i></div> </div>				
<b>10</b>	<i>Potassium methylate</i> is used to make a variety of soaps and in the pharmaceutical industry. <b>Solve the problem.</b> Calculate the mass of potassium methylate obtained at the interaction of methanol with the weight of 6,4 g with potassium, if the reaction is proceeds according to the scheme:			L	L
	$CH_3OH + K \rightarrow CH_3OK + H_2$ ( <i>establish and write the coefficients!</i> )			0	0
	<i>It is given:</i>			1	1
	<i>Solve:</i>			2	2
	_____			3	3
	_____			4	4
	_____			5	5
	_____			6	6
	_____			7	7
	_____			8	8
<i>Answer:</i> _____					

**11** Acetic acid ( $CH_3COOH$ ) is used in food seasoning in the form of vinegar and is part of the washing and cleaning products.

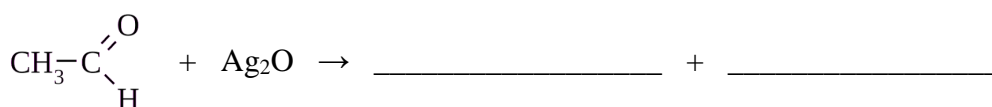
**I.** Write in the space reserved below the equation reactions between acetic acid with three of the substances in the proposed line:  $Na_2CO_3$ ,  $CaO$ ,  $C_2H_5OH$ ,  $Ba(OH)_2$ ,  $Zn$ .

a) \_\_\_\_\_

b) \_\_\_\_\_

c) \_\_\_\_\_

**II.** Complete the scheme of the reaction equation of obtaining of acetic acid with the formulas of the corresponding substances and coefficients:



L	L
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

**12** **I.** From the line:



select and write in the space reserved the formula and the name of a substance for each characteristic:

No.	Characteristic of substance	Formula of the substance	Name of substance
1	Participates in the alcoholic fermentation reaction		
2	Is a representative of the arenas		
3	It is used as a flavoring		
4	Forms an aldehyde at the interaction with water		

**II.** Write the physical property for the substance  $C_6H_{12}O_6$ :

\_\_\_\_\_

**III.** Write a reaction equation of obtaining for the substance  $CH=CH$ :

\_\_\_\_\_

L	L
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11

## SISTEMUL PERIODIC AL ELEMENTELOR CHIMICE

	I	II	III	IV	V	VI	VII	VIII					
1	1 <b>H</b> 1,0079 Hidrogen									2 <b>He</b> 4,0026 Helium			
2	3 <b>Li</b> 6,941 Litiu	4 <b>Be</b> 9,01218 Beriliu	5 <b>B</b> 10,81 Bor	6 <b>C</b> 12,011 Carbon	7 <b>N</b> 14,0067 Azot	8 <b>O</b> 15,9994 Oxigen	9 <b>F</b> 18,9984 Fluor	10 <b>Ne</b> 20,179 Neon					
3	11 <b>Na</b> 22,98977 Sodiu	12 <b>Mg</b> 24,305 Magneziu	13 <b>Al</b> 26,98154 Aluminiu	14 <b>Si</b> 28,0855 Siliciu	15 <b>P</b> 30,97376 Fosfor	16 <b>S</b> 32,06 Sulf	17 <b>Cl</b> 35,453 Clor	18 <b>Ar</b> 39,948 Argon					
4	19 <b>K</b> 39,0983 Potasiu	20 <b>Ca</b> 40,08 Calciu	21 44,9559 Scandiu	22 47,88 Titan	23 50,9415 Vanadiu	24 51,996 Crom	25 54,938 Mangan	26 55,847 Fier	27 58,9332 Cobalt	28 58,69 Nichel			
	29 63,546 Cupru	30 65,38 Zinc	31 69,72 Galiu	32 72,59 Germaniu	33 74,9216 Arsen	34 78,96 Seleniu	35 79,904 Brom	36 83,80 Kripton					
5	37 85,4678 Rubidiu	38 87,62 Stronțiu	39 88,9059 Ytriu	40 91,22 Zirconiu	41 92,9064 Niobiu	42 95,94 Molibden	43 [98] Tehnețiu	44 101,07 Ruteniu	45 102,9055 Rodiu	46 106,42 Paladiu			
	47 107,868 Argint	48 112,41 Cadmium	49 114,82 Indiu	50 118,69 Staniu	51 121,75 Stibiu	52 127,60 Telur	53 126,9045 Iod	54 131,29 Xenon					
6	55 132,9054 Ceziu	56 137,33 Bariu	57* 138,9055 Lantan	72 178,49 Hafniu	73 180,948 Tantal	74 183,85 Volfram	75 186,207 Reniu	76 190,2 Osmiu	77 192,22 Iridiu	78 195,08 Platina			
	79 196,9665 Aur	80 200,59 Mercur	81 204,383 Taliu	82 207,2 Plumb	83 208,9804 Bismut	84 [209] Poloniu	85 [210] Astatiniu	86 [222] Radon					
7	87 [223] Franciu	88 226,0254 Radium	89** 227,0278 Actiniu	104 [261] Rutherfordium	105 [262] Dubnium	106 [263] Seaborgium	107 [262] Bohrium	108 [267,13] Hassium	109 [268,14] Meitnerium	110 [281] Darmstadtium			

\*Lantanie

58 140,12 Ce Ceriu	59 140,9077 Pr Praseodim	60 144,24 Nd Neodim	61 [145] Pm Prometiu	62 150,36 Sm Samariu	63 151,96 Eu Europiu	64 157,25 Gd Gadolinu	65 158,9254 Tb Terbiu	66 162,50 Dy Disprosiu	67 164,9304 Ho Holmiu	68 167,26 Er Erbiu	69 168,9342 Tm Tuliu	70 173,04 Yb Yterbiu	71 174,967 Lu Lutetiu
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\*\*Actinide

90 232,0381 Th Toriu	91 231,0359 Pa Protactiniu	92 238,0389 U Uranu	93 237,0482 Np Neptuniu	94 [244] Pu Plutoniu	95 [243] Am Americiu	96 [247] Cm Curiu	97 [247] Bk Berkeliu	98 [251] Cf Californiu	99 [252] Es Einsteiniu	100 [257] Fm Fermiu	101 [258] Md Mendeleviu	102 [255] No Nobelium	103 [260] Lr Lawrenciu
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### SOLUBILITATEA ACIZILOR, BAZELOR, SĂRURILOR ÎN APĂ

	H <sup>+</sup>	NH <sub>4</sub> <sup>+</sup>	Li <sup>+</sup>	Na <sup>+</sup>	K <sup>+</sup>	Ba <sup>2+</sup>	Ca <sup>2+</sup>	Mg <sup>2+</sup>	Al <sup>3+</sup>	Cr <sup>3+</sup>	Zn <sup>2+</sup>	Mn <sup>2+</sup>	Fe <sup>2+</sup>	Fe <sup>3+</sup>	Pb <sup>2+</sup>	Cu <sup>2+</sup>	Ag <sup>+</sup>
OH <sup>-</sup>		S↑	S	S	S	S	P	I	I	I	I	I	I	I	I	I	-
F <sup>-</sup>	S	S	P	S	S	P	I	I	P	I	S	S	I	I	I	S	S
Cl <sup>-</sup>	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P	S	I
Br <sup>-</sup>	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P	S	I
I <sup>-</sup>	S	S	S	S	S	S	S	S	S	S	S	S	S	-	I	-	I
S <sup>2-</sup>	S↑	S	S	S	S	S	S	S	-	-	I	I	I	-	I	I	I
SO <sub>3</sub> <sup>2-</sup>	S↑	S	S	S	S	I	I	I	-	-	I	-	I	-	I	I	I
SO <sub>4</sub> <sup>2-</sup>	S	S	S	S	S	I	P	S	S	S	S	S	S	S	I	S	P
CO <sub>3</sub> <sup>2-</sup>	S↑	S	S	S	S	I	I	I	-	-	I	I	I	-	I	-	I
SiO <sub>3</sub> <sup>2-</sup>	I	-	S	S	S	I	I	I	-	-	I	I	I	-	I	-	-
NO <sub>3</sub> <sup>-</sup>	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PO <sub>4</sub> <sup>3-</sup>	S	S	I	S	S	I	I	I	I	I	I	I	I	I	I	I	I
CH <sub>3</sub> COO <sup>-</sup>	S	S	S	S	S	S	S	S	S	-	S	S	S	-	S	S	S

Notă: S – substanță solubilă, I – insolubilă, P – puțin solubilă; «>» substanța nu există sau se descompune în apă; ↑ - substanța se degajă sub formă de gaz sau se descompune cu degajare de gaz

### SERIA ELECTRONEGATIVITĂȚII

<b>F</b>	<b>O</b>	<b>N</b>	<b>Cl</b>	<b>Br</b>	<b>I</b>	<b>S</b>	<b>C</b>	<b>Se</b>	<b>P</b>	<b>H</b>	<b>As</b>	<b>B</b>	<b>Si</b>	<b>Al</b>	<b>Mg</b>	<b>Ca</b>	<b>Li</b>	<b>Na</b>	<b>K</b>
<b>4,0</b>	<b>3,5</b>	<b>3,07</b>	<b>3,0</b>	<b>2,8</b>	<b>2,5</b>	<b>2,5</b>	<b>2,5</b>	<b>2,4</b>	<b>2,1</b>	<b>2,1</b>	<b>2,0</b>	<b>2,0</b>	<b>1,8</b>	<b>1,5</b>	<b>1,2</b>	<b>1,04</b>	<b>1,0</b>	<b>0,9</b>	<b>0,8</b>

### SERIA TENSIUNII METALELOR

Li K Ba Ca Na Mg Al Mn Zn Cr Fe Ni Sn Pb (H) Cu Hg Ag Pt Au