

No.	Items	Score										
		1	2									
1	<p>Sea buckthorn fruits have an antiviral effect, being extremely rich in vitamins, minerals and active substances. Their composition includes the following chemical elements: <i>Fe, P, Mg, C</i>.</p> <p>Complete the blank spaces in the statements below:</p> <p>a) <i>For iron:</i> It is situated in the 4th period, in the group ....., the ..... subgroup, contains in the nucleus ..... protons and ..... neutrons.</p> <p>b) <i>For phosphorus:</i> Has the spread of electrons on energetic levels ....., it forms higher oxide with the chemical formula ....., the character of the higher oxide is .....</p> <p>c) <i>For magnesium:</i> Has on the last energy level ..... electrons, it forms hydroxide with the chemical formula .....</p> <p>d) <i>For carbon:</i> Forms a volatile compound with hydrogen with the chemical formula ..... and its called .....</p>	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											
2	<p>Signal flares are needed by hunters, fishermen, geologists, and rescuers. The signal cartridge, which produces a bright color signal, includes a mixture of substances that contains the chemical elements: <i>Ba, N, O, Cl, Cu, H</i>.</p> <p><b>I.</b> Using <b>only</b> the proposed chemical elements, compose and write in the space reserved the chemical formula <b>of a</b> 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 for a substance with a <i>nonpolar covalent bond</i>:</p> <p>a) a physical property _____</p> <p>b) a specific field of use _____</p> <p><b>II.</b> Write the equation of the obtaining reaction for the substance with a <i>ionic bond</i>: _____</p>	L	L									
		0	0									
		1	1									
		2	2									
		3	3									
		4	4									
		5	5									
		6	6									
		7	7									
		8	8									
3	<p><i>Zinc chloride</i> is used as an electrolyte in batteries that increases their lifetime and provides higher power.</p> <p><b>I.</b> Complete the blank spaces in the table for the substances used to obtain zinc chloride:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Class of compounds</th> <th style="width: 33%;">Formula of the substance</th> <th style="width: 33%;">Name of substance</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">ZnO</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">HCl</td> <td></td> </tr> </tbody> </table> <p><b>II.</b> Write the equations of the obtaining reactions of the <i>zinc chloride</i>:</p> <p>1) <math>ZnO + HCl \rightarrow</math> _____ + _____</p> <p>2) <math>Zn + HCl \rightarrow</math> _____ + _____</p>	Class of compounds	Formula of the substance	Name of substance		ZnO			HCl		L	L
		Class of compounds	Formula of the substance	Name of substance								
			ZnO									
			HCl									
		0	0									
		1	1									
		2	2									
		3	3									
		4	4									
		5	5									
6	6											
7	7											
8	8											





**9** I. Complete the blank spaces of the table:

No.	Structural semi-developed formula of the substance	Name of substance	Class of organic compounds
1.	$\begin{array}{c} \text{CH}_3-\text{CH}_2-\text{CH}-\text{CH}_3 \\   \\ \text{OH} \end{array}$		
2.		pent-2-ine	
3.			aldehydes

II. Write the structural semi-developed formula and the name of an *isomer* for the substance 1:

\_\_\_\_\_

(formula)

\_\_\_\_\_

(name)

III. Write the structural semi-developed formula and the name of a *homologue* for the substance 2:

\_\_\_\_\_

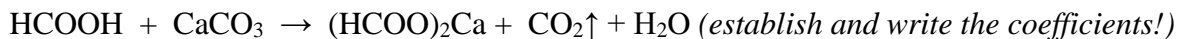
(formula)

\_\_\_\_\_

(name)

**10** Calcium formate is used as an additive in construction mortar and all types of concrete to accelerate the setting speed of cement, especially in winter construction.

**Solve the problem.** Calculate the weight of calcium formate, obtained at the interaction of formic acid and calcium carbonate, if 2,24 l (STP) of carbon (IV) oxide are obtained. The reaction proceeds according to the scheme:



It is given:

Solution:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Answer: \_\_\_\_\_

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

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

<p><b>11</b></p>	<p>Write the reaction equations for the schemes below:</p> <p>1) <math>\text{CH}_3\text{-CH}_2\text{-CH}_3 \rightarrow \text{CH}_2=\text{CH-CH}_3</math></p> <p>_____</p> <p>2) <math>\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow \text{C}_2\text{H}_5\text{OH}</math></p> <p>_____</p> <p>3) <math>\text{CH}\equiv\text{CH} \rightarrow \text{CH}_3\text{-CH=O}</math></p> <p>_____</p> <p>4) <math>\text{C}_6\text{H}_6 \rightarrow \text{C}_6\text{H}_5\text{Cl}</math></p> <p>_____</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>12</b></p>	<p><b>I.</b> Write, to the left of the order numbers of the substances in column <b>A</b>, the letter corresponding to the field of use in column <b>B</b>:</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: center; width: 50%;"><b>A</b></th> <th style="text-align: center; width: 50%;"><b>B</b></th> </tr> </thead> <tbody> <tr> <td>____ 1. ethene</td> <td>a) production of synthetic rubber</td> </tr> <tr> <td>____ 2. methane</td> <td>b) as a flavoring agent</td> </tr> <tr> <td>____ 3. methyl ethanoate</td> <td>c) as a fuel</td> </tr> <tr> <td>____ 4. buta-1,3-diene</td> <td>d) preservative used in the food industry</td> </tr> <tr> <td>____ 5. ethanoic acid</td> <td>e) production of polyethylene</td> </tr> </tbody> </table> <p><b>II.</b> Characterize one of the proposed substances according to the plan:</p> <p>a) chemical formula _____</p> <p>b) a physical property</p> <p>_____</p> <p>c) the reaction equation that characterizes a chemical property:</p> <p>_____</p>	<b>A</b>	<b>B</b>	____ 1. ethene	a) production of synthetic rubber	____ 2. methane	b) as a flavoring agent	____ 3. methyl ethanoate	c) as a fuel	____ 4. buta-1,3-diene	d) preservative used in the food industry	____ 5. ethanoic acid	e) production of polyethylene	<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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## 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 Oxygen	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 <b>Ga</b> 69,72 Galiu	32 <b>Ge</b> 72,59 Germaniu	33 <b>As</b> 74,9216 Arsen	34 <b>Se</b> 78,96 Seleniu	35 <b>Br</b> 79,904 Brom	36 <b>Kr</b> 83,80 Kripton				
5	37 <b>Rb</b> 85,4678 Rubidiu	38 <b>Sr</b> 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 <b>In</b> 114,82 Indiu	50 <b>Sn</b> 118,69 Staniu	51 <b>Sb</b> 121,75 Stibiu	52 <b>Te</b> 127,60 Telur	53 <b>I</b> 126,9045 Iod	54 <b>Xe</b> 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 Reni	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] Poloni	85 [210] Astatiniu	86 [222] Radon				
7	87 <b>Fr</b> [223] Franciu	88 <b>Ra</b> 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 Plutoni	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 Nobeliu	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