



**OLIMPIADA NAȚIONALĂ DE CHIMIE**  
**SIBIU, 25-29 aprilie 2026**  
**Ediția a LIX-a**

**Barem de evaluare și de notare**  
**Proba Teoretică**  
**Clasa a VIII-a**

- Orice modalitate de rezolvare corectă a cerințelor va fi punctată corespunzător.
- Se acordă 10 puncte din oficiu.

**Subiectul I** \_\_\_\_\_ **20 de puncte**

10 grile x 2 puncte = 20 puncte

|   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| c | b | a | e | c | d | b | c | e | a  |

**Subiectul II** \_\_\_\_\_ **20 de puncte**

**A.** \_\_\_\_\_ **13 puncte**

**a. Determinarea prin calcul a formulei substanței A:**  $\text{MnO}_2$  \_\_\_\_\_ **1 punct**

**b. 14 substanțe x 0,5 puncte** \_\_\_\_\_ **7 puncte**

|   |                          |
|---|--------------------------|
| b | $\text{MnCl}_2$          |
| c | $\text{Cl}_2$            |
| d | $\text{Mn}(\text{OH})_2$ |
| e | $\text{NaCl}$            |
| f | $\text{MnMnO}_3$         |
| g | $\text{AgNO}_3$          |
| h | $\text{AgCl}$            |

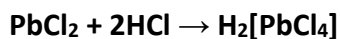
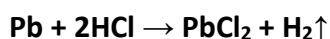
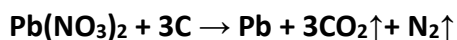
|   |                            |
|---|----------------------------|
| i | $\text{Mn}(\text{NO}_3)_2$ |
| j | $\text{Mn}_2\text{O}_3$    |
| k | $\text{NO}_2$              |
| l | $\text{MnSO}_4$            |
| m | $\text{KNO}_3$             |
| n | $\text{KNO}_2$             |
| p | $\text{K}_2\text{MnO}_4$   |

**c. 10 ecuații x 0,5 puncte** \_\_\_\_\_ **5 puncte**

- (1)  $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2\uparrow + 2\text{H}_2\text{O}$
- (2)  $\text{MnCl}_2 + 2\text{NaOH} \rightarrow \text{Mn}(\text{OH})_2\downarrow + 2\text{NaCl}$
- (3)  $2\text{Mn}(\text{OH})_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{MnMnO}_3 + 2\text{H}_2\text{O}$
- (4)  $\text{MnCl}_2 + 2\text{AgNO}_3 \rightarrow 2\text{AgCl}\downarrow + \text{Mn}(\text{NO}_3)_2$
- (5)  $2\text{Mn}(\text{OH})_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{Mn}_2\text{O}_3 + 2\text{H}_2\text{O}$
- (6)  $\text{Mn}(\text{NO}_3)_2 \rightarrow \text{MnO}_2 + 2\text{NO}_2\uparrow$
- (7)  $2\text{NO}_2 + 2\text{KOH} \rightarrow \text{KNO}_3 + \text{KNO}_2 + \text{H}_2\text{O}$
- (8)  $\text{Mn}(\text{OH})_2 + 2\text{HNO}_3 \rightarrow \text{Mn}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$
- (9)  $\text{Mn}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{MnSO}_4 + 2\text{H}_2\text{O}$
- (10)  $\text{MnSO}_4 + 2\text{K}_2\text{CO}_3 + 2\text{KNO}_3 \rightarrow \text{K}_2\text{MnO}_4 + 2\text{KNO}_2 + \text{K}_2\text{SO}_4 + 2\text{CO}_2\uparrow$

B. \_\_\_\_\_ 7 puncte

a. 3 ecuații x 1 punct \_\_\_\_\_ 3 puncte



b. \_\_\_\_\_ 4 puncte

$n \text{Pb}(\text{NO}_3)_2 = 0,06 \text{ moli}$  /  $m \text{Pb}(\text{NO}_3)_2 = 19,86\text{g}$  \_\_\_\_\_ 1 punct

$n_{\text{C}} = 0,2 \text{ moli}$  /  $m_{\text{C}} = 2,4\text{g}$  \_\_\_\_\_ 1 punct

$\% \text{Pb}(\text{NO}_3)_2 = 89,21\%$  \_\_\_\_\_ 1 punct

$\% \text{C} = 10,78\%$  \_\_\_\_\_ 1 punct

**Subiectul III** \_\_\_\_\_ **30 de puncte**

A. \_\_\_\_\_ 15 puncte

a. \_\_\_\_\_ 3 puncte

$m_1 = 193,67 \text{ kg}$  \_\_\_\_\_ 2 puncte

$m_2 = 290,51 \text{ kg}$  \_\_\_\_\_ 1 punct

b. \_\_\_\_\_ 12 puncte

Ecuația reacției chimice:  $2\text{HNO}_3 \rightarrow 2\text{NO}_2\uparrow + \frac{1}{2}\text{O}_2\uparrow + \text{H}_2\text{O}$  \_\_\_\_\_ 1 punct

$m_{\text{HNO}_3 \text{ inițial}} = 0,55 m_1$  \_\_\_\_\_ 1 punct

$m_{\text{HNO}_3 \text{ descompus}} = 0,044 m_1$  \_\_\_\_\_ 1 punct

$m_{\text{HNO}_3 \text{ rămas}} = 0,506 m_1$  \_\_\_\_\_ 1 punct

$m_{\text{S HNO}_3 \text{ final}} = 0,516 m_1$  \_\_\_\_\_ 2 puncte

$m_{\text{gaze (NO}_2 \text{ și O}_2)} = 0,0377 m_1$  \_\_\_\_\_ 2 puncte

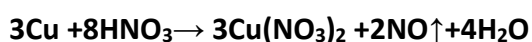
$m_{\text{H}_2\text{SO}_4} = 0,96 m_2$  \_\_\_\_\_ 1 punct

$m_{\text{sol. finală}}$  \_\_\_\_\_ 2 puncte

$\text{C}_{\text{H}_2\text{SO}_4} = 73,98\%$  \_\_\_\_\_ 1 punct

B. \_\_\_\_\_ 15 puncte

a. 3 ecuații x 2 puncte \_\_\_\_\_ 6 puncte



- b. \_\_\_\_\_ 9 puncte
- $n_{\text{gaze}} = 0,15 \text{ moli}$  \_\_\_\_\_ 2 puncte
- $n_{\text{inițial Ba(OH)}_2} = 0,05 \text{ moli}$  \_\_\_\_\_ 1 punct
- $n_{\text{reacționat Ba(OH)}_2} = 0,025 \text{ moli}$  \_\_\_\_\_ 1 punct
- $n_{\text{NO}_2} = 0,05 \text{ moli}$  \_\_\_\_\_ 1 punct
- $n_{\text{NO}} = 0,1 \text{ moli}$  \_\_\_\_\_ 1 punct
- $n_{\text{HNO}_3} = 0,5 \text{ moli}$  \_\_\_\_\_ 1 punct
- $m_{\text{s HNO}_3} = 116 \text{ g}$  \_\_\_\_\_ 1 punct
- $c_{\text{HNO}_3} = 27,16\%$  \_\_\_\_\_ 1 punct

#### Subiectul IV \_\_\_\_\_ 20 de puncte

- a. \_\_\_\_\_ 17 puncte
- $C_{\text{oleum final}} = 8,27\%$  \_\_\_\_\_ 1 punct
- ecuația reacției chimice \_\_\_\_\_ 1 punct
- $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$
- $m_{\text{H}_2\text{O (I)}} = 0,6477 \text{ g}$  \_\_\_\_\_ 3 puncte
- ecuația reacției chimice \_\_\_\_\_ 1 punct
- $M_x A_y + xy \text{ AgNO}_3 \rightarrow y \text{ Ag}_x A + xM(\text{NO}_3)_y$
- $n_{\text{AgNO}_3} = 0,0016 \text{ moli}$  \_\_\_\_\_ 1 punct
- relația  $\mu_A = 35,5 \cdot x$  \_\_\_\_\_ 2 puncte
- $x = 1, A = \text{Cl}$  \_\_\_\_\_ 1 punct
- $m_{\text{MCl}_y \text{ (II)}} = 0,1040 \text{ g}$  \_\_\_\_\_ 2 puncte
- relația  $\mu_M = 29,5 \cdot y$  \_\_\_\_\_ 2 puncte
- $y = 2, M = \text{Co}$  \_\_\_\_\_ 1 punct
- deducere  $z = 6$  \_\_\_\_\_ 1 punct
- formula cristalohidratului  $\text{CoCl}_2 \cdot 6 \text{ H}_2\text{O}$  \_\_\_\_\_ 1 punct

b. \_\_\_\_\_ 3 puncte

20° C:  $\text{CoCl}_2 \cdot 6 \text{H}_2\text{O}$  = culoare roz \_\_\_\_\_ 1 punct

100° C:  $\text{CoCl}_2 \cdot \text{H}_2\text{O}$  = culoare violet \_\_\_\_\_ 1 punct

120° C:  $\text{CoCl}_2$  = culoare albastră \_\_\_\_\_ 1 punct

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