

MINISTERUL EDUCAȚIEI, CERCETĂRII ȘI TINERETULUI

OLIMPIADA NAȚIONALĂ DE CHIMIE

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Clasa a VIII-a

PROBA PRACTICĂ

BAREM DE CORECTARE ȘI NOTARE

SUBIECT (90p)

- completarea corectă a tabelului 1 – 35 puncte
- completarea corectă a tabelului 2 – 55 puncte
- se acordă din oficiu – 10 puncte

Tabelul 1. Rezultatele obținute în urma identificării:

Nr. eprubetă	1	2	3	4	5
Substanțe	$\text{Cu}(\text{NO}_3)_2$	$\text{Al}(\text{NO}_3)_3$	FeSO_4	$\text{Zn}(\text{NO}_3)_2$	$\text{Fe}(\text{NO}_3)_3$
Reactiv					
NaOH	$\text{Cu}(\text{OH})_2 \downarrow$ pp.verde-albăstrui	$\text{Al}(\text{OH})_3 \downarrow$ pp.alb	$\text{Fe}(\text{OH})_2 \downarrow$ pp.alb $\text{Fe}(\text{OH})_2 \cdot 2\text{Fe}(\text{OH})_3$ verde-negru	$\text{Zn}(\text{OH})_2 \downarrow$ pp.alb, gelatinos	$\text{Fe}(\text{OH})_3 \downarrow$ pp.roșu-brun
NaOH exces	Insolubil	$\text{Al}(\text{OH})_4^-$	Insolubil	$\text{Zn}(\text{OH})_4^{2-}$ incolor	Insolubil
NH₃	$\text{Cu}(\text{OH})_2 \downarrow$ pp.verde-albăstrui	$\text{Al}(\text{OH})_3 \downarrow$ pp.alb	$\text{Fe}(\text{OH})_2 \downarrow$ pp.alb	$\text{Zn}(\text{OH})_2 \downarrow$ pp.alb	$\text{Fe}(\text{OH})_3 \downarrow$ pp.roșu-brun
NH₃ exces	$[\text{Cu}(\text{NH}_3)_4]^{2+}$ albastru intens	Solubil numai in exces mare $\text{Al}(\text{OH})_4^-$ incolor	Insolubil	$\text{Zn}(\text{NH}_3)_4^{2+}$ incolor	Insolubil
KI	$2\text{CuI}_2 \downarrow = 2\text{CuI}$ pp.alb murdar + I_2 brun	x	x	x	$\text{Fe}^{2+} + \text{I}_2$ brun

Nr. crt.	Substanța identificată	Reactivul	Reacții
1	$\text{Cu}(\text{NO}_3)_2$	NaOH	$\text{Cu}(\text{NO}_3)_2 + \text{NaOH} = \text{Cu}(\text{OH})_2 \downarrow + \text{NaNO}_3$ verde - albastrui
		NaOH exces	Insolubil Solubil numai în soluții foarte concentrate de NaOH cu formare de $\text{Cu}(\text{OH})_4^{2-}$
		NH₃	$\text{Cu}(\text{NO}_3)_2 + 2\text{NH}_4\text{OH} = \text{Cu}(\text{OH})_2 \downarrow + 2\text{NH}_4\text{NO}_3$
		NH₃ exces	$\text{Cu}(\text{OH})_2 + 2\text{NH}_3 + 2\text{NH}_4^+ = [\text{Cu}(\text{NH}_3)_4]^{2+} + 2\text{HOH}$ albastru
		KI	$\text{Cu}^{2+} + \text{KI} = \text{CuI}_2 + 2\text{K}^+$ $2\text{CuI}_2 = 2\text{CuI} \downarrow + \text{I}_2$ alb
2	$\text{Al}(\text{NO}_3)_3$	NaOH	$\text{Al}(\text{NO}_3)_3 + 3\text{NaOH} = \text{Al}(\text{OH})_3 \downarrow + 3\text{NaNO}_3$ alb, gelatinos
		NaOH exces	$\text{Al}(\text{OH})_3 + \text{HO}^- = \text{Al}(\text{OH})_4^-$
		NH₃	$\text{Al}(\text{NO}_3)_3 + 3\text{NH}_4\text{OH} \Leftrightarrow \text{Al}(\text{OH})_3 \downarrow + 3\text{NH}_4\text{NO}_3$ Alb, gelatinos
		NH₃ exces	Solubil numai în exces mare de reactiv
		KI	x
3	FeSO_4	NaOH	$\text{FeSO}_4 + 2\text{NaOH} = \text{Fe}(\text{OH})_2 \downarrow + \text{Na}_2\text{SO}_4$ alb (în aer culoarea se schimbă de la verde la roșu brun)
		NaOH exces	Insolubil
		NH₃	$\text{FeSO}_4 + 2\text{NH}_4\text{OH} \Leftrightarrow \text{Fe}(\text{OH})_2 \downarrow + (\text{NH}_4)_2\text{SO}_4$ alb
		NH₃ exces	Insolubil
		KI	x
4	$\text{Zn}(\text{NO}_3)_2$	NaOH	$\text{Zn}(\text{NO}_3)_2 + 2\text{NaOH} = \text{Zn}(\text{OH})_2 \downarrow + 2\text{NaNO}_3$ alb, gelatinos
		NaOH exces	$\text{Zn}(\text{OH})_2 + 2\text{HO}^- = \text{Zn}(\text{OH})_4^{2-}$
		NH₃	$\text{Zn}(\text{NO}_3)_2 + 2\text{NH}_4\text{OH} \Leftrightarrow \text{Zn}(\text{OH})_2 \downarrow + 2\text{NH}_4\text{NO}_3$ alb, amorf
		NH₃ exces	$\text{Zn}(\text{OH})_2 + 2\text{NH}_3 + 2\text{NH}_4^+ = [\text{Zn}(\text{NH}_3)_4]^{2+} + 2\text{HOH}$
		KI	x
5	$\text{Fe}(\text{NO}_3)_3$	NaOH	$\text{Fe}(\text{NO}_3)_3 + 3\text{NaOH} = \text{Fe}(\text{OH})_3 \downarrow + 3\text{NaNO}_3$ Brun roșcat
		NaOH exces	Insolubil
		NH₃	$\text{Fe}(\text{NO}_3)_3 + 3\text{NH}_4\text{OH} = \text{Fe}(\text{OH})_3 \downarrow + 3\text{NH}_4\text{NO}_3$ Brun roșcat
		NH₃ exces	Insolubil
		KI	$2\text{Fe}^{3+} + 2\text{I}^- = 2\text{Fe}^{2+} + \text{I}_2$ brun