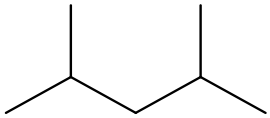
Nacionalni centar za vanjsko vrednovanje obrazovanja

RJEŠENJA PROBNOGA ISPITA DRŽAVNE MATURE IZ **KEMIJE**
U ŠKOLSKOJ GODINI 2023./2024.

ISPITNA KNJIŽICA 1

BROJ ZADATKA	TOČAN ODGOVOR
1.	A
2.	D
3.	A
4.	B
5.	D
6.	A
7.	B
8.	A
9.	C
10.	C
11.	D
12.	A
13.	C
14.	A
15.	D
16.	B
17.	A
18.	C
19.	B
20.	C
21.	C
22.	C
23.	D
24.	D
25.	D
26.	D
27.	B
28.	D
29.	A
30.	B
31.	D
32.	C
33.	C
34.	B
35.	A

ISPITNA KNJIŽICA 2

BROJ ZADATKA	TOČAN ODGOVOR	BOD
1.1.		**1 BOD**
1.2.	amonijev hidrogenkarbonat	**1 BOD**
2.	Rješenje: $C_{10}H_{20}O_2$ Postupak (priznaju se i drugi točni postupci rješavanja) $N(\mathrm{C}) = \frac{w(\mathrm{C}) \cdot M_r(\text{spoj})}{A_r(\mathrm{C})} = \frac{0{,}697 \cdot 172{,}2}{12} = 10$ $N(\mathrm{H}) = \frac{w(\mathrm{H}) \cdot M_r(\text{spoj})}{A_r(\mathrm{H})} = \frac{0{,}117 \cdot 172{,}2}{1{,}01} = 20$ $N(\mathrm{O}) = \frac{w(\mathrm{O}) \cdot M_r(\text{spoj})}{A_r(\mathrm{O})} = \frac{0{,}186 \cdot 172{,}2}{16} = 2$	**1 BOD** za empirijsku formulu ili usporedbu brojnosti pojedinih atoma (rješenje i postupak) **1 BOD** Točno napisana molekulska formula
3.1.	Rješenje: $t < 40$ °C $w(\mathrm{KNO_3}) = \frac{m(\mathrm{KNO_3})}{m(\mathrm{KNO_3}) + m(\mathrm{H_2O})} \qquad m(\mathrm{KNO_3}) = m(\mathrm{x})$ $0{,}375 = \frac{m(\mathrm{x})}{m(\mathrm{x}) + 100} \Rightarrow 0{,}375\mathrm{x} + 37{,}5 = \mathrm{x}$ $\Rightarrow 0{,}625\ \mathrm{x} = 37{,}5 \Rightarrow \mathrm{x} = \frac{37{,}5}{0{,}625} = 60\ \mathrm{g}$	**1 BOD**
3.2.	$m(\mathrm{KNO_3})_{\text{talog}} = 10$ g	**1 BOD**
4.1.	Mg(s) | Mg^{2+}(aq) ¦¦ Ag^{+}(aq) | Ag(s)	**1 BOD**
4.2.	Mg(s) + 2 Ag^{+}(aq) → Mg^{2+}(aq) + 2 Ag(s)	**1 BOD**

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5.1.	Rješenje: 120 g mol^{-1} $\Pi = i \cdot c \cdot R \cdot T \Rightarrow \Pi = \frac{i \cdot n \cdot R \cdot T}{V} = \frac{i \cdot m \cdot R \cdot T}{M \cdot V} = \frac{i \cdot \gamma \cdot R \cdot T}{M}$ $\Rightarrow M = \frac{i \cdot \gamma \cdot R \cdot T}{\Pi}$ $M = \frac{1 \cdot 570\ \text{g m}^{-3} \cdot 8{,}31\ \text{J K}^{-1}\ \text{mol}^{-1} \cdot 298\ \text{K}}{11762\ \text{J m}^{-3}} = 120\ \text{g mol}^{-1}$	**1 BOD**
5.2.	$\Delta_f H(\text{X}) = -110{,}9\ \text{kJ mol}^{-1}$	**1 BOD**
6.1.	Alotropske modifikacije, alotropi	**1 BOD**
6.2.	:Ö=Ö: ili :Ö—Ö:	**1 BOD**
6.3.	Rješenje: $N(\text{O}_3) = 1{,}6 \times 10^{19}$ $N(\text{O}_3) = n(\text{O}_3) \cdot N_\text{A} = \frac{V(\text{O}_3)}{V_\text{m}} \cdot N_\text{A} = \frac{\varphi(\text{O}_3) \cdot V_{(\text{zrak})}}{V_\text{m}} \cdot N_\text{A}$ $N(\text{O}_3) = \frac{6 \times 10^{-7} \cdot 1 \times 10^{3}\ \text{dm}^3}{22{,}4\ \text{dm}^3\ \text{mol}^{-1}} \cdot 6{,}02 \times 10^{23}\ \text{mol}^{-1} = 1{,}6 \times 10^{19}$	**1 BOD**
7.1.	$K_\text{p} = \frac{p^2(\text{NH}_3)}{p(\text{N}_2) \cdot p^3(\text{H}_2)}$	**1 BOD**
7.2.	smanjit će se	**1 BOD**
7.3.	Rješenje: 29 kPa $x(\text{N}_2) = \frac{10\ \text{mol}}{40\ \text{mol}} = 0{,}25$ $p(\text{N}_2) = x(\text{N}_2) \cdot p = 0{,}25 \cdot 116\ \text{kPa} = 29\ \text{kPa}$	**1 BOD**
8.1.	A = bireta, B = Erlenmeyerova tikvica	**1 BOD**
8.2.	$KOH + HNO_3 \rightarrow KNO_3 + H_2O$ ili $H_3O^+ + OH^- \rightarrow 2\ H_2O$	**1 BOD**

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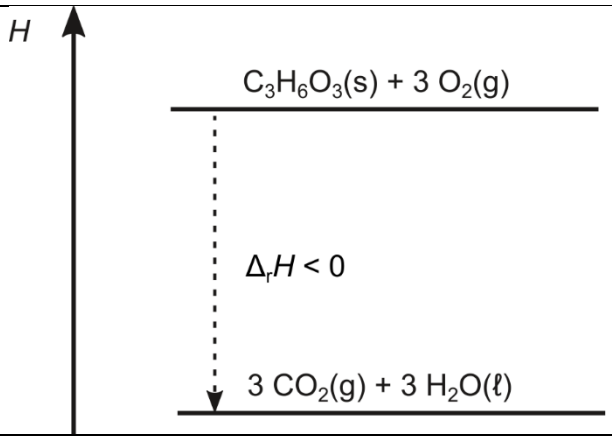
8.3.	bezbojna, nema boju	**1 BOD**
9.1.	$\bar{v} = -\frac{\Delta c(H_2O_2)}{2 \cdot \Delta t}$, $\bar{v} = \frac{\Delta c(H_2O_2)}{\nu(H_2O_2) \cdot \Delta t}$	**1 BOD**
9.2.	$\bar{v} = 1{,}3 \times 10^{-2}$ mmol $L^{-1} min^{-1}$ $\bar{v} = -\frac{\Delta c(H_2O_2)}{\Delta t} = -\frac{(7{,}2 - 9{,}8)\text{ mmol } L^{-1}}{(400 - 200)\text{ min}} = 1{,}3 \times 10^{-2}$ mmol $L^{-1} min^{-1}$	**1 BOD**
9.3.	Energija aktivacije će se smanjiti.	**1 BOD**
9.4.	Brzina se povećava.	**1 BOD**
10.1.	kancerogeno ili teratogeno ili mutageno	**1 BOD**
10.2.	fosforov(III) klorid ili PCl_3	**1 BOD**
10.3.	trigonsko bipiramidalna ili trostrana bipiramida	**1 BOD**
10.4.	Rješenje: $n(P_4$, neizragirano) = 0,5 mol $n(Cl_2) = 0{,}6$ mol $\quad \xi(Cl_2) = \frac{-0{,}6\text{ mol}}{-6} = 0{,}1$ mol $\rightarrow$ mjerodavni reaktant $n(P_4) = 0{,}6$ mol $n(P_4$, neizreagirano) = $n(P_4$, početno) - $n(P_4$, izreagirano) $n(P_4$, neizreagirano) = 0,6 mol - 0,1 mol = 0,5 mol	**1 BOD**
11.1.		**1 BOD**

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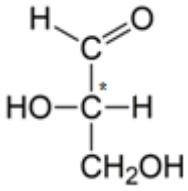
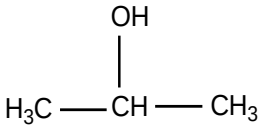
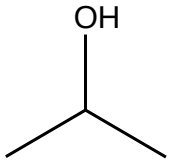
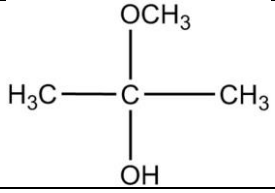
11.2.	$n(C_3H_6O_3) = \frac{\Delta H \cdot \nu(C_3H_6O_3)}{\Delta_c H(C_3H_6O_3)} = \frac{-1086\ \text{kJ} \cdot 1}{-1448\ \text{kJ mol}^{-1}} = 0{,}75\ \text{mol}$	**1 BOD**
11.3.	$V(CO_2) = 3 \cdot n(C_3H_6O_3) \cdot V_m = 3 \cdot 3\ \text{mol} \cdot 22{,}4\ \text{dm}^3\ \text{mol}^{-1} = 201{,}6\ \text{dm}^3$	**1 BOD**
11.4.		**1 BOD**
12.1.	 ili 	**1 BOD**
12.2.		**1 BOD**
12.3.	nukleofilnoj adiciji	**1 BOD**
12.4.	II	**1 BOD**