

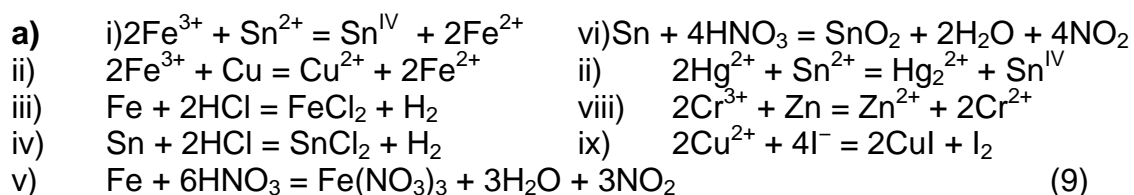
Tallinna XII koolinoorte keemiaolümpiaadi koolivoor
2011/ 2012 õ.-a.

Ülesannete lahendused

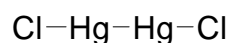
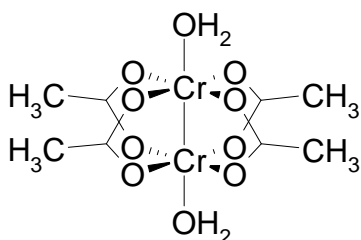
11. klass

Lahendus

1(10)



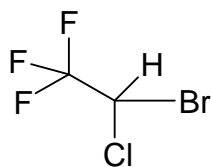
b)



(1)
10p

2.(10)

a.



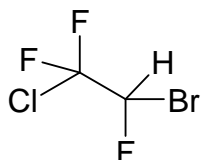
(1)

b. Fluorotaani brutovaalem - $\text{C}_2\text{HBrF}_3\text{Cl}$

$\text{Mr}(\text{C}_2\text{HBrF}_3\text{Cl}) = 2 \times 12 + 1 + 80 + 3 \times 19 + 35 = 197$

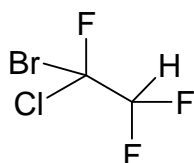
(1)

c. Fluorotani isomeerid:



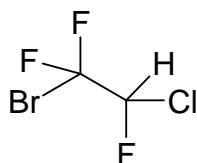
2-bromo-1-kloro- 1,1,2- trifluoroetaan

(2)



1-bromo-1-kloro- 1,2,2- trifluoroetaan

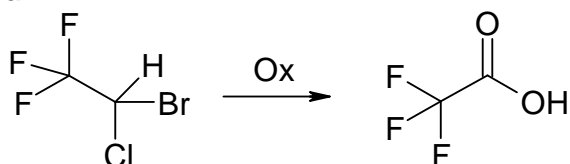
(2)



1-bromo- 2- kloro- 1,1,2-trifluoroetaan

(2)

d.



(2)
10p

3.(10)

a. $M(\text{CoCl}_2) = 129,83 \text{ g/mol}$

$M(\text{CoCl}_2 \cdot 6\text{H}_2\text{O}) = 237,83 \text{ g/mol}$

(1)

Cl^- sisaldus:

$$\frac{2 \cdot 35,5}{238} \cdot 100\% = 29,8\%$$

(1)

b. Kristallvee sidumises osalevad $4s4p^34d^2$ orbitaalid

(2)

c.

$$\begin{array}{rcc} 152,9 \text{ g} & 100 \text{ g} & 52,9 \text{ g} \\ 20^\circ\text{C} & \text{Lahus} = \text{lahusti} + & \text{lahustunud aine} \\ & 100 \text{ g} & X \quad Y \end{array}$$

$X = m(\text{lahusti}) = 65,40 \text{ g}$

(1)

$Y = m(\text{CoCl}_2) = 34,60 \text{ g}$

(1)

Olgu lisatava $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ moolide arv n.

n mooli $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ toob n mooli CoCl_2 ja 6 mooli vett.

(1)

$$\begin{array}{rcc} & 100 \text{ g} & 106,2 \text{ g} \\ 100^\circ\text{C} & \text{Lahus} = \text{lahusti} & + \text{lahustunud aine} \\ & 65,40 \text{ g} + 6n \cdot 18 \text{ g/mol} & 34,60 \text{ g} + n129,83 \text{ g/mol} \end{array}$$

$$\frac{106,2 \text{ g}}{100 \text{ g}} = \frac{34,60 \text{ g} + n \times 129,83 \text{ g/mol}}{65,40 \text{ g} + 6n \times 18,00 \text{ g/mol}}$$

$$1,062 \times (65,40 + 108 \text{ g/mol} \cdot n) = 34,60 + 129,83 \text{ g/mol} \cdot n$$

$n = 2,3 \text{ mooli}$

(2)

Lisatava kristallsoola mass : $2,3 \cdot 237,83 = 547,0 \text{ grammi} \approx 550 \text{ g}$

(1)

10p

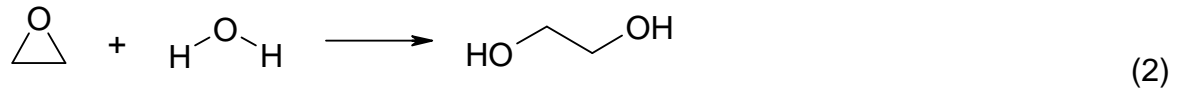
alternatiivlahendus:

$$\frac{106,2}{206,2} = \frac{34,6 \text{ g} + m \frac{129,8}{237,8}}{100 \text{ g} + m}, \text{ kus } m = m(\text{CoCl}_2 \cdot 6\text{H}_2\text{O})$$

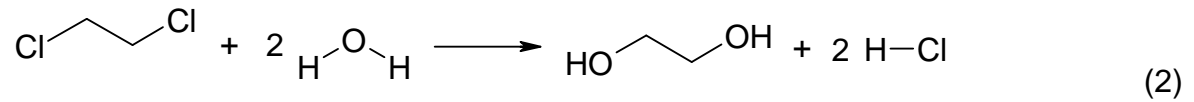
$m = 548,7 \text{ g} \approx 550 \text{ g}$

4.(10)

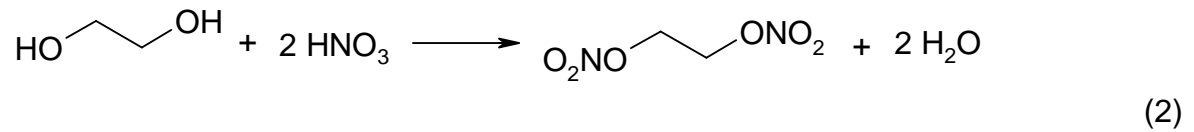
a.



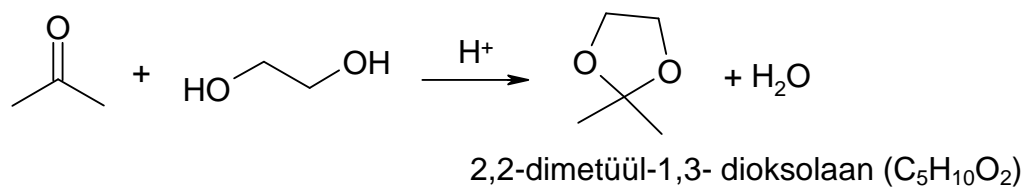
b.



c.

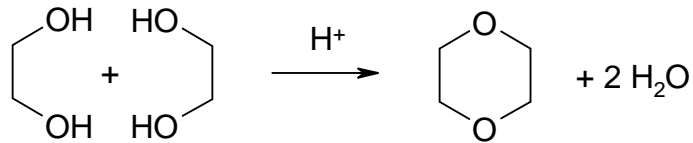


d.



(2)

e.



(2)
10p