

9. klass

1. a) H_2SO_4 – väävelhape
 b) HNO_3 – lämmastikhape
 c) H_2SO_3 – väävlishape
 d) HIO – hüpojoodishape
 e) HClO – hüpokloorishape
 f) HBrO – hüprobroomishape
 g) H_2CO_2 – metaanhape (HCOOH)
2. a) $m'(\text{FeSO}_4) = 250 \text{ g} \cdot (1,00 - 0,82) = 45 \text{ g}$
 b) i) $m'(\text{FeSO}_4 \cdot 7\text{H}_2\text{O}) = 45 \text{ g} \cdot \frac{278}{152} = 82,3 \text{ g} \approx 82 \text{ g}$
 ii) $m(\text{H}_2\text{O}) = 250 \text{ g} - 82 \text{ g} = 168 \text{ g}$
 c) $m''(\text{FeSO}_4) = 103 \text{ g} \cdot 0,136 = 14 \text{ g}$
 $m(\text{FeSO}_4) = 45 \text{ g} - 14 \text{ g} = 31 \text{ g}$
 $m(\text{FeSO}_4 \cdot 7\text{H}_2\text{O}) = 31 \text{ g} \cdot \frac{278}{152} = 56,7 \text{ g} \approx 57 \text{ g}$
3. a) $\text{Me} + 2\text{HCl} = \text{MeCl}_2 + \text{H}_2 \uparrow$
 Me Y H_2
- b) $n(\text{H}_2) = 3,136 \text{ dm}^3 \cdot \frac{1 \text{ mol}}{22,4 \text{ dm}^3} = 0,14 \text{ mol}$
- c) 4 : 2 : 1
 $n(\text{A}) + n(\text{B}) + n(\text{C}) = 0,14 \text{ mol}$
 i) $n(\text{A}) = \frac{4}{7} \cdot 0,14 = 0,08 \text{ mol}$
 ii) $n(\text{B}) = \frac{2}{7} \cdot 0,14 = 0,04 \text{ mol}$
 iii) $n(\text{C}) = \frac{1}{7} \cdot 0,14 = 0,02 \text{ mol}$
- d) $0,08 \text{ mol} \cdot 3x \text{ g/mol} + 0,04 \text{ mol} \cdot 5x \text{ g/mol} + 0,02 \text{ mol} \cdot 7x \text{ g/mol} = 4,64 \text{ g}; \quad x = 8$
- e) i) $M(\text{A}) = 3 \text{ g/mol} \cdot 8 = 24 \text{ g/mol}$ **A** – Mg, magneesium
 ii) $M(\text{B}) = 5 \text{ g/mol} \cdot 8 = 40 \text{ g/mol}$ **B** – Ca, kaltsium
 iii) $M(\text{C}) = 7 \text{ g/mol} \cdot 8 = 56 \text{ g/mol}$ **C** – Fe, raud
4. a) i) $\text{Ba}(\text{OH})_2 + \text{H}_2\text{SO}_4 = \text{BaSO}_4 \downarrow + 2\text{H}_2\text{O}$
 ii) $2\text{NaOH} + \text{H}_2\text{SO}_4 = \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
- b) $\text{Ba}(\text{OH})_2$ Y BaSO_4
 171 g/mol 233 g/mol
 $m[\text{Ba}(\text{OH})_2] = \frac{1}{1} \cdot 14,0 \text{ g} \cdot \frac{1 \text{ mol}}{233 \text{ g}} \cdot 171 \text{ g/mol} = 10,3 \text{ g}$
 $m(\text{leelised}) = 250 \text{ g} \cdot 0,105 = 26,3 \text{ g}$
 $m(\text{NaOH}) = 26,3 \text{ g} - 10,3 \text{ g} = 16,0 \text{ g}$
- c) $n(\text{H}_2\text{SO}_4) = 250 \text{ g} \cdot 0,100 \cdot \frac{1 \text{ mol}}{98,1 \text{ g}} = 0,255 \text{ mol}$
- d) $\text{Ba}(\text{OH})_2$ Y H_2SO_4
 171 g/mol
 $n'(\text{H}_2\text{SO}_4) = 10,3 \text{ g} \cdot \frac{1 \text{ mol}}{171 \text{ g}} = 0,0602 \text{ mol} \approx 0,060 \text{ mol}$
 NaOH neutraliseerimiseks jääb

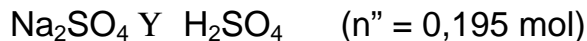
$$n''(\text{H}_2\text{SO}_4) = 0,255 \text{ mol} - 0,060 \text{ mol} = 0,195 \text{ mol}$$

NaOH neutraliseerimiseks kuluks

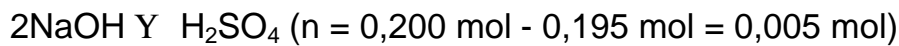


40,0 g/mol

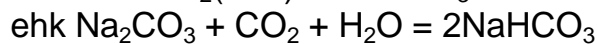
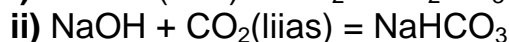
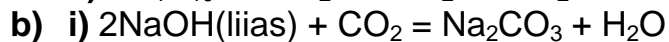
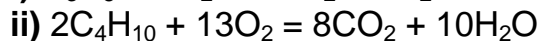
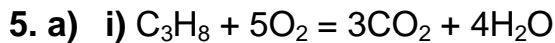
$$n(\text{H}_2\text{SO}_4) = \frac{1}{2} \cdot 16,0 \text{ g} \cdot \frac{1 \text{ mol}}{40,0 \text{ g}} = 0,200 \text{ mol}$$



$$n(\text{Na}_2\text{SO}_4) = \frac{1}{1} \cdot 0,195 \text{ mol} = \mathbf{0,195 \text{ mol}}$$



$$n(\text{NaOH}) = \frac{2}{1} \cdot 0,005 \text{ mol} = \mathbf{0,010 \text{ mol}}$$



c) $n'(\text{CO}_2) = \frac{1}{1} \cdot 95,4 \text{ g} \cdot \frac{1 \text{ mol}}{106 \text{ g}} = 0,900 \text{ mol}$

$$n''(\text{CO}_2) = \frac{1}{1} \cdot 84,0 \text{ g} \cdot \frac{1 \text{ mol}}{84,0 \text{ g}} = 1,00 \text{ mol}$$

$$n(\text{CO}_2) = n' + n'' = \mathbf{1,90 \text{ mol}}$$

d) $n(\text{gaase}) = 11,2 \text{ dm}^3 \cdot \frac{1 \text{ mol}}{22,4 \text{ dm}^3} = 0,500 \text{ mol}$

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$$(0,500 \text{ mol} - x) \cdot 3 + x \cdot 4 = 1,90 \text{ mol}$$

$$1,50 \text{ mol} - 3x + 4x = 1,90 \text{ mol}; \quad x = 0,40 \text{ mol}$$

$$n(\text{C}_4\text{H}_{10}) = 0,40 \text{ mol}$$

$$n(\text{C}_3\text{H}_8) = 0,50 \text{ mol} - 0,40 \text{ mol} = 0,10 \text{ mol}$$

i) $m(\text{C}_3\text{H}_8) = 0,10 \text{ mol} \cdot 44,0 \text{ g/mol} = \mathbf{4,4 \text{ g}}$

ii) $m(\text{C}_4\text{H}_{10}) = 0,40 \text{ mol} \cdot 58,0 \text{ g/mol} = \mathbf{23,2 \text{ g}}$

6. a) $M(\text{X}) = 7,87 \text{ g/cm}^3 \cdot 7,09 \text{ cm}^3/\text{mol} = 55,8 \text{ g/mol}$

X – Fe, raud

b) Y – Al, alumiinium

A – H₂O, vesi

B – H₂, vesinik

C – Fe₃O₄, raud(II,III)oksiid

D – Al₂O₃, alumiiniumoksiid

E – Cl₂, kloor

F – FeCl₃, raud(III)kloriid

G – FeCl₂, raud(II)kloriid

H – O₂, hapnik

I – Fe₂O₃, raud(III)oksiid

