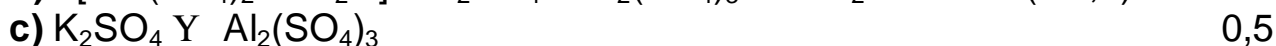
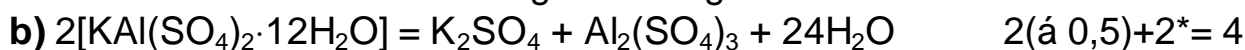


**1999/2000 õa keemiaolümpiaadi piirkondliku vooru  
ülesannete lahendused  
8. klass**

1. a)  $M_r[\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}] = 1 \cdot 39,1 + 1 \cdot 27,0 + 2 \cdot 32,1 + 8 \cdot 16,0 + 24 \cdot 1,01 + 12 \cdot 16,0 =$   
 $= 474,5 \gg 474 \quad 3(\text{á } 0,5) + 3^* = 6$

**Märkus:** Õige on 474, sest vesiniku aatommass on ümardatud suuremaks. Vastus 475 lugeda ka õigeks.

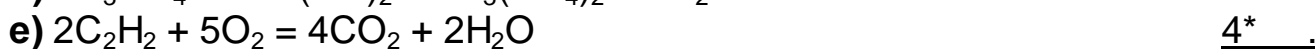
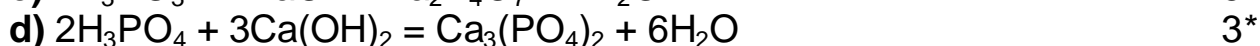
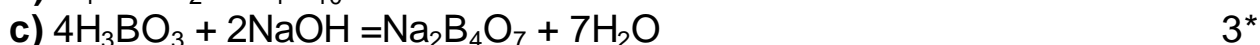


$N[\text{Al}_2(\text{SO}_4)_3] = \frac{1}{1} \cdot 2 \text{ molekuli} = 2 \text{ molekuli} \quad 1$



$N(\text{H}_2\text{O}) = \frac{24}{1} \cdot 2 \text{ molekuli} = 48 \text{ molekuli} \quad 1$

**13 p**



**14 p**

3. a)  $\rho(\text{kett}) = 35,9 \text{ g} : 13,3 \text{ cm}^3 = 2,70 \text{ g/cm}^3 \quad 1,5$

Kett oli valmistatud alumiiniumist. 0,5

b) i)  $13,3 \text{ cm}^3 \quad 1$

ii)  $35,9 \text{ g} \cdot \frac{1 \text{ cm}^3}{10,5 \text{ g}} = 3,42 \text{ cm}^3 \quad 2$

iii)  $35,9 \text{ g} \cdot \frac{1 \text{ cm}^3}{19,3 \text{ g}} = 1,86 \text{ cm}^3 \quad 2$

**7 p**

4. a)  $72,72\% = \frac{2 \cdot A_r(\text{Y})}{44,0} \cdot 100\%$ , millest  $A_r(\text{Y}) = \frac{72,72}{100} \cdot 44,0 \cdot \frac{1}{2} = 16,0 \quad 1,5 + 1 = 2,5$

$100\% - 72,72\% = \frac{A_r(\text{X})}{44,0} \cdot 100\%$ , millest  $A_r(\text{X}) = \frac{27,28}{100} \cdot 44,0 = 12,0 \quad 1,5 + 1 = 2,5$

$100\% - 88,80\% = \frac{2 \cdot A_r(\text{Z})}{18,0} \cdot 100\%$ , millest  $A_r(\text{Z}) = \frac{11,20}{100} \cdot 18,0 \cdot \frac{1}{2} = 1,01 \quad 2,5$

Y – O, hapnik; X – C, süsinik; Z – H, vesinik (á 0,5\*) 1,5

**Märkus:** 100% on üks tervik, mis on alati lõpmatult täpne.

- b)  $\text{XY}_2 - \text{CO}_2$  1\*  
 $\text{Z}_2\text{Y} - \text{H}_2\text{O}$  1\*  
 $\text{XZ}_4 - \text{CH}_4$  1\*
- c)  $\%(\text{C}) = \frac{12,0}{16,0} \cdot 100 = 75,0$  1  
 $\%(\text{H}) = \frac{4 \cdot 1,01}{16,0} \cdot 100 = 25,3$  2.
- Märkus:** Lahendus  $\%(\text{H}) = 100 - 75,0$  ei vasta ülesandes püstitatud tingimustele. **15 p**

5. a) järjenumber = prootonite arv = elektronide arv 2\*
- b) **X** – O, hapnik, 8, VI, 16; **Y** – Na, naatrium, 11, I, 23;  
**Z** – C, süsinik, 6, IV, 12; **Q** – H, vesinik, 1, I, 1 (á1\*) 4
- c)  $8 + 11 + 6 + 1 = 26$  1\*  
 $\text{VI} + \text{I} + \text{IV} + \text{I} = \text{XII}$  1\*  
**1)**  $26 - 16 = 10$  1\*  
**2)**  $11 - 1 = 10$  1\*  
**3)**  $16 - 6 = 10$  1\*  
**11 p**

6. a)  $b = a + 2,00 \text{ amü}$  1\*  
 $2b = 2a + 2 \cdot 2,00 \text{ amü}$  1\*  
 $2b = 2a \cdot 1,0571$  1\*  
 $2a \cdot 1,0571 = 2a + 2 \cdot 2,00 \text{ amü}$  1\*  
 $a = \frac{2,00 \text{ amü}}{0,0571} = 35,0 \text{ amü}$  1  
 $b = 35,0 \text{ amü} + 2,00 \text{ amü} = 37,0 \text{ amü}$  1
- b)  $M_r(\text{X}) = 35,0 + 0,5 = 35,5$  1  
Element **X** on **Cl**, kloor. 1\*
- c) Kergem isotoop koosneb 17 prootonist, 17 elektronist ja 18 neutronist. 1,5\*  
Raskemal isotoobil on prootonite ja elektronide arv sama (17), kuid neutroneid on 20. 1,5\*  
**11 p**