

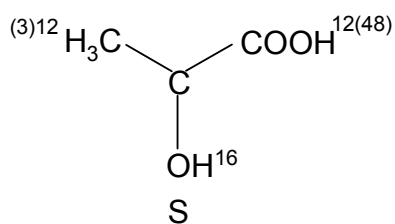
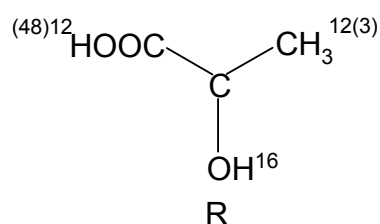
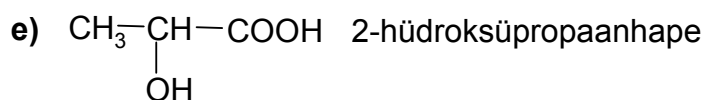
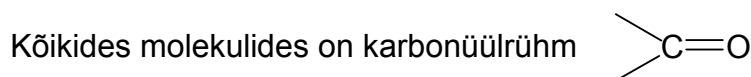
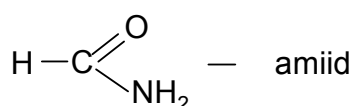
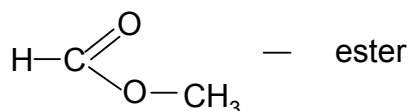
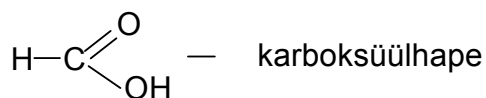
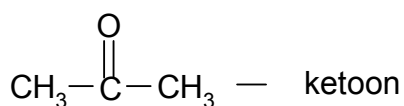
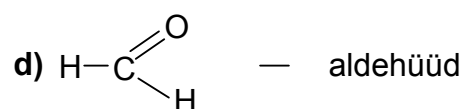
**2003/2004 õa keemiaolümpiaadi piirkonnavooru  
ülesannete lahendused  
12. klass**

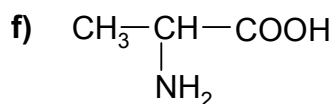


b)  $\sigma$ -side tekib orbitaalide kattumisel ühes kohas;  $\pi$ -side tekib p-orbitaalide kattumisel kahes kohas.

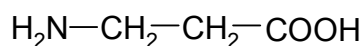
c) i) Mõlemal süsivesinikul on süsiniku aatomite vahel kovalentne mitte-polaarne side.

ii) Mõlemal süsivesinikul on süsiniku ja vesiniku aatomite vahel kovalentne polaarne side.





$\alpha$ -aminopropaanhape



$\beta$ -aminopropaanhape

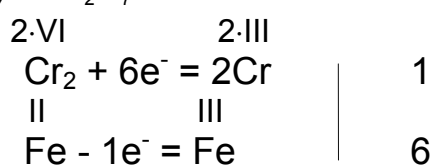
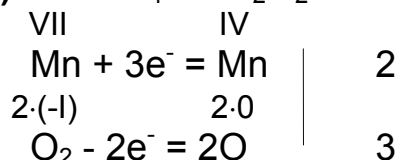
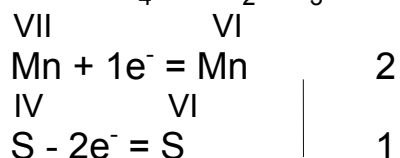
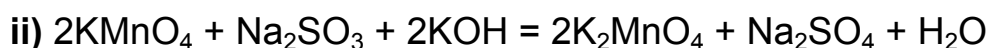
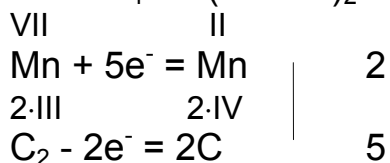
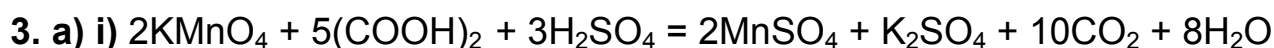
$$\text{2. a) } m(^{235}\text{U}) = 6,0 \cdot 10^{10} \text{ tonni} \cdot \frac{64,5 \text{ kg}}{2,71 \cdot 10^5 \text{ tonni}} = 1,42 \cdot 10^7 \text{ kg} \approx 1,4 \cdot 10^7 \text{ kg} = \\ = 1,4 \cdot 10^4 \text{ tonni}$$

$$\text{b) } k = \frac{\ln 2}{7,4 \cdot 10^8 \text{ aastat}} = 9,367 \cdot 10^{-10} \text{ aasta}^{-1}$$

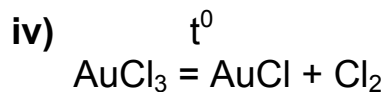
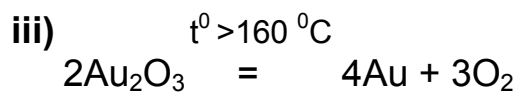
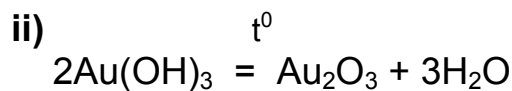
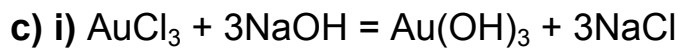
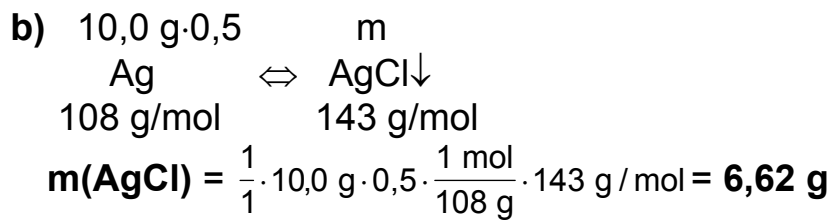
$$t = \ln \frac{100}{90} \cdot \frac{1}{9,367 \cdot 10^{-10} \text{ aasta}^{-1}} = 1,1 \cdot 10^8 \text{ aastat}$$

c) 1,0 miljardi aasta pärast

$$m(^{235}\text{U}) = 1,42 \cdot 10^4 \text{ tonni} \cdot e^{-9,367 \cdot 10^{-10} \cdot a^{-1} \cdot 1,0 \cdot 10^9 \text{ a}} = 0,556 \cdot 10^4 \text{ tonni} \approx \\ \approx 5,6 \cdot 10^3 \text{ tonni}$$



Vasakule tuleb 14(+), s.o. 14H<sup>+</sup> juurde liita



**A** –  $\text{AuCl}_3$ , kuld(III)kloriid

**B** –  $\text{H[AuCl}_4]$ , vesiniktetrakloroauraat(III)

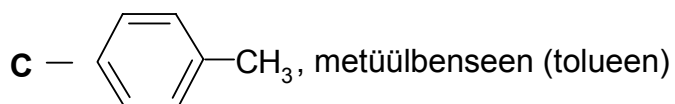
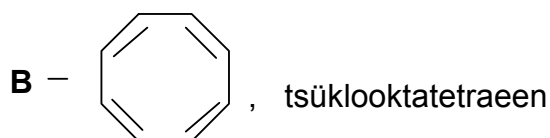
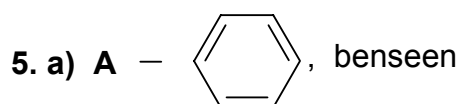
**C** –  $\text{Au(OH)}_3$ , kuld(III)hüdroksoiid

**D** –  $\text{Au}_2\text{O}_3$ , kuld(III)oksiid

**E** –  $\text{AuCl}$ , kuld(I)kloriid

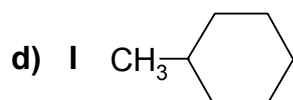
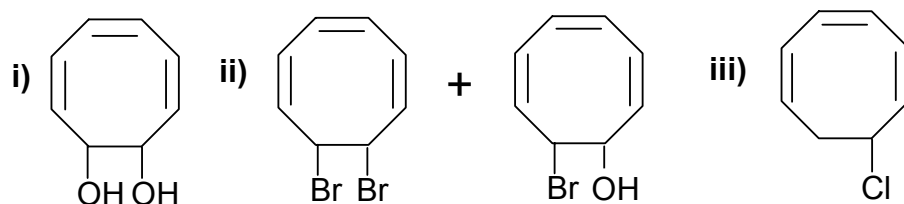
d) i)  $\%(\text{Au}) = \frac{197}{303} \cdot 100 = \mathbf{65}$

ii)  $\%(\text{Au}) = \frac{197}{232} \cdot 100 = 84,9 \approx \mathbf{85}$



b) Ühendis **A** on 6 ühist  $\pi$ -elektroni ja see on aromaadne. Ühendis **B** on 8 ühist  $\pi$ -elektroni ja see ei ole aromaadne ( $4n + 2$ ,  $n = 0, 1, 2\dots$ ).

c) Ühend **B** kui alkeen astub reaktsiooni, areen nimetatud reagentidega ei reageeri

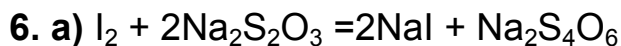


III bensoehape

IV  $\text{Br}_2, h\nu$ ; fenüülbromometaan; bensüülbromiid

V,  $\text{Br}_2/\text{FeBr}_3$ ; 1-bromo-4-metüülbenseen;

VI  $\text{CH}_3\text{COCl}/\text{AlCl}_3$ ; (4-metüül-fenüül)metüülketoon



b)  $n(\text{S}_2\text{O}_3^{2-}) = 823,0 \mu\text{L} \cdot 0,09880 \text{ M} = 81,31 \mu\text{mol}$

$n(\text{IO}_4^-, \text{ reageerimata}) = \frac{1}{2} \cdot 81,31 \mu\text{mol} = 40,66 \mu\text{mol}$

$n(\text{IO}_4^-, \text{ esialgne kogus}) = 2,000 \text{ ml} \cdot 0,0487 \text{ M} = 97,40 \mu\text{mol}$

$n(\text{IO}_4^-, \text{ mis kulus proteiiniga reageerimiseks}) = 97,40 \mu\text{mol} - 40,66 \mu\text{mol} = 56,74 \mu\text{mol}$

$n(\text{proteiin}) = \frac{128,6 \text{ mg}}{58600 \text{ g/mol}} = 2,195 \mu\text{mol}$

$N = \frac{56,74 \mu\text{mol}}{2,195 \mu\text{mol}} = 25,85 \approx 26 \text{ jääki/1 molek. proteiinis}$