

Olimpíadas de Química 2004

NOME: _____

ESCOLA: _____

<i>Questão</i>	<i>Cotação</i>
1^a	6p
2^a	6p
3^a	5p
4^a	4p
5^a	4p
Total	25p

Problema I – Química Geral

- I.1 (a) (b) (c) (d) (e)
- I.2 (a) (b) (c) (d)
- I.3 (a) (b) (c) (d) (e)
- $[(\text{CH}_3)_2\text{NNH}_2 + 2\text{N}_2\text{O}_4 \rightleftharpoons 3\text{N}_2 + 2\text{CO}_2 + 4\text{H}_2\text{O}]$
- I.4 (a) (b) (c) (d)
- I.5 (a) (b) (c) (d) (e)
- I.6 (a) (b) (c) (d)

FOLHA DE RESPOSTA

Problema II – A molécula de hidrogénio e o catião molecular H_2^+

II.1

H_2 : 80 pm H_2^+ : 110 pm

II.2

H_2 : 440 kJ/mol H_2^+ : 260 kJ/mol

II.3

$\text{IE}(\text{H}_2) = 1400 \text{ kJ/mol}$

II.4

$\text{IE}(\text{H}) = 1220 \text{ kJ/mol}$

II.5

$$E_c = h\nu - \text{IE}(\text{H}_2)$$

$$h\nu = 6,62 \times 10^{-34} \text{ Js} \times 3,9 \times 10^{15} \text{ s}^{-1} = 2,5818 \times 10^{-18} \text{ J}$$

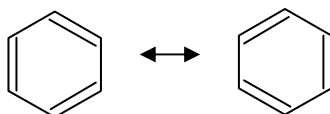
$$\text{IE}(\text{H}_2) = 1400 \text{ kJ mol}^{-1} / 6,022 \times 10^{23} \text{ mol}^{-1} = 2,3248 \times 10^{-18} \text{ J}$$

$$E_c = (1/2)mv^2 \quad v = \sqrt{(2E_c/m)}$$

$$v = 752 \text{ km s}^{-1}$$

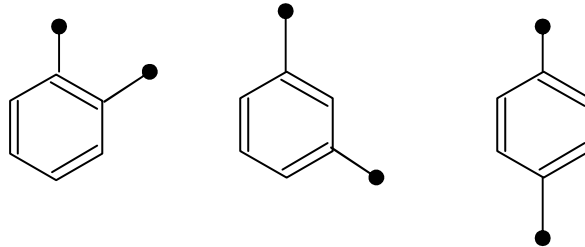
Problema III – Benzeno

III.1

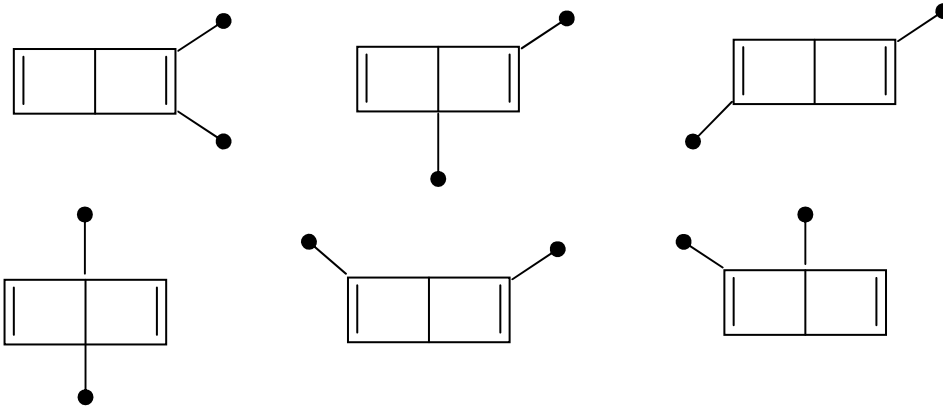


FOLHA DE RESPOSTA

III.2

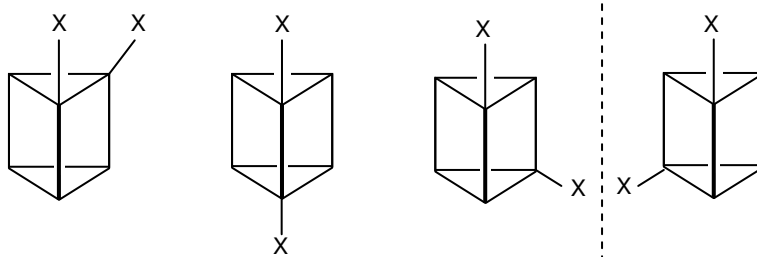


III.3



(6 isómeros)

III.4

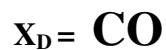
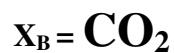


(isómero óptico)

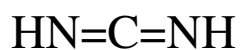
FOLHA DE RESPOSTA

Problema IV – CaCN_2 – um fertilizante ainda importante

IV.1



IV.2



e

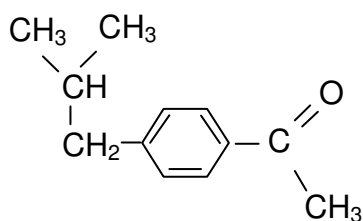


(O mais estável é o que permite uma distribuição electrónica mais simétrica)

Problema V - Química Orgânica

V.1

A



B

