

Acid/Base Chemistry

1. **B** 2. **A** 3. **C** 4. **B** 5. **C** 6. **C** 7. **C** 8. **C**

Chemical Reactions

$2.7 \times 10^{23} - 3.3 \times 10^{23}$ molecules

Physical Properties

Oxidation: $\text{H}_2\text{O}_2 \rightarrow \text{O}_2 + 2\text{H}^+ + 2\text{e}^-$
Reduction: $2\text{H}^+ + 2\text{e}^- + \text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O}$

Thermodynamics

Which fuel: **methane**
How many fewer moles of CO_2 : **45-47** moles

Physical Properties

lowest mp $\text{CH}_4 < \text{NH}_3 < \text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (or $\text{C}_3\text{H}_8\text{O}$)
< $\text{NaCl} < \text{BeO}$ highest mp

Acids and Bases

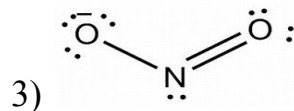
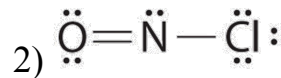
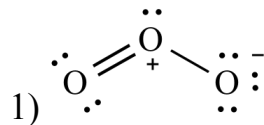
6 resonance forms

Thermodynamics

$$\Delta G(\text{reaction 1}) = \mathbf{28 \text{ to } 32} \text{ kJ/mol}$$

$$\Delta G(\text{reaction 2}) = \mathbf{-12 \text{ to } -10} \text{ kJ/mol}$$

Reaction (2) is more likely to be irreversible

Physical Properties

(angle of bonds don't matter; lone pairs and charges do:

1 has pos charge N and neg charge on one O, 3 has neg charge on one O.)

Physical Properties

- a) HF
- b) OF₂
- c) HCN

Physical Properties

5.5 - 6.1 g/L

Electrochemistry

Oxidation half reaction: $4\text{Al} \rightarrow 4\text{Al}^{3+} + 12\text{e}^{-}$
Reduction half reaction: $3\text{O}_2 + 12\text{e}^{-} \rightarrow 6\text{O}^{2-}$

Acid/Base Chemistry

$\text{HX } K_a = 5.70 \times 10^{-5} - 6.7 \times 10^{-5}$
 $\text{HY } K_b = 3.50 \times 10^{-4} - 4.50 \times 10^{-4}$
HY solution

Kinetics

285 - 305 g

Physical Chemistry

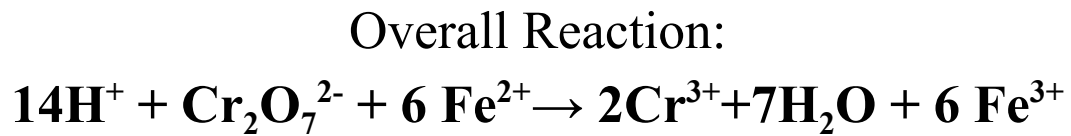
4-4.8 atm

Physical Properties

moles of He: **1.3 - 2.0 mol**
partial pressure: **2.0 - 2.6 atm**

Chemical Reactions

$3.3 \times 10^{22} - 4.0 \times 10^{22}$ atoms of oxygen
 $1.0 \times 10^{23} - 1.2 \times 10^{23}$ atoms of hydrogen

Chemical Reactions**Thermodynamics**

1206 - 1216 kJ

Chemical Reactions

$$[\text{CP}] = \mathbf{1/n} [\text{HPO}_4^{2-}]$$

Physical Properties

6.9 - 7.1 %

Equilibrium

Partial Pressure of $\text{N}_2\text{O}_4(\text{g})$: **0.7-0.9 atm**
Partial Pressure of $\text{NO}_2(\text{g})$: **0.3-0.36 atm**

Equilibrium

5-6 atm

Physical Properties

n=4

l=1

mp=1

ms= +1/2 or -1/2 (either is acceptable)

Acid/Base Chemistry

I, IV

Acid/Base Chemistry

- a) weakly acidic
- b) strong basic
- c) weak basic
- d) weak acidic
- e) strong acidic
- f) neutral

Physical Properties

- I (B)
- II (C)
- III (B)

Acid/Base Chemistry

1:A/B 2:B 3:B/C

Acid/Base Chemistry

**equivalent
strong
base
strong
acid**

Equilibrium

pOH= 10-11

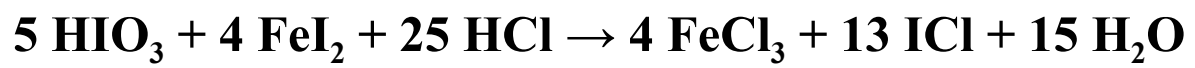
Chemical Reactions

Empirical formula: CH₂O

Equilibrium

5.7-6.3 atm

Chemical Reactions



Equilibrium

pOH= 11-12

increase

decrease

Equilibrium

$$K = 0.43-0.50$$

Acid/Base Chemistry

$$pOH = 12.5-13.5$$

Physical Properties



Monovalent atomic cation: \mathbf{He}^+

Acid/Base Chemistry

pH of Beaker 1: **11.9-12.7**
pH of Beaker 2: **10.5-11.5**

Equilibrium

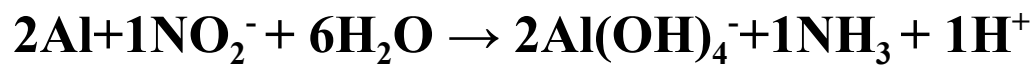
- a) **trans-2-butene**
- b) **right**
- c) **exergonic**

Physical Properties

Highest **NO^+** > **NO_2^+** > **NO_2Cl** > **NO_3^-** Lowest

Physical Properties

0.0305-0.0321 atm

Chemical Reactions**Thermodynamics**

a) (±/-)

b) (+/±)

c) (+/±)

d) (±/-)

e) (+/±)