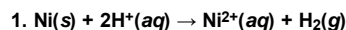


Chemistry (Grades 9–12)

Subtest 2 Sample Items



In the reaction shown above, 2 mol of electrons are transferred to H^+ and the standard electrochemical cell potential is 0.25 V. Based on this information, what is the value of the standard Gibbs free energy change for this reaction?

- A. -12 kJ/mol
- B. -24 kJ/mol
- C. -48 kJ/mol
- D. -220 kJ/mol

2. The widely different melting points of CaCl_2 and CH_4 shown in the table below can be attributed to which of the following differences between the two compounds?

Compound	Melting Point ($^{\circ}\text{C}$)
CaCl_2	775
CH_4	-182.5

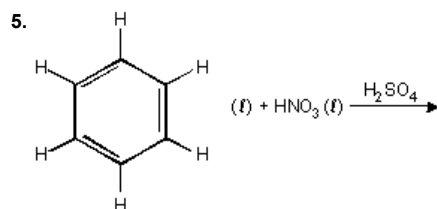
- A. The molar mass of CaCl_2 is greater than the molar mass of CH_4 .
- B. The two compounds are in different states at standard temperature and pressure conditions.
- C. The two compounds have a different number of valence electrons.
- D. The attractive forces between CH_4 molecules are weaker than the attractive forces present between the ions that form CaCl_2 .

3. Which of the following compounds has a linear molecular geometry?

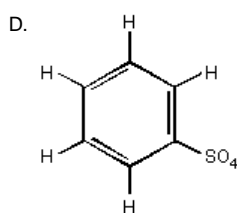
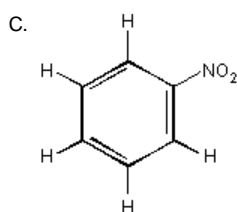
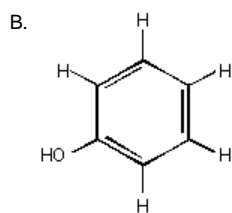
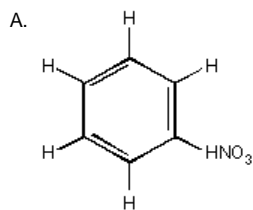
- A. SCN^-
- B. BrF_5
- C. NO_3^-
- D. H_3O^+

4. A chemical reaction is proposed to take place in a single elementary step. Which of the following provides the best evidence to support the proposed reaction mechanism?

- A. The balanced chemical equation for the reaction consists of a single reactant.
- B. The experimentally determined rate law is equal to the rate law consistent with a single elementary step.
- C. The reaction mechanism does not involve the formation of reaction intermediates.
- D. The rate constant for the rate law corresponding to the single elementary step is equal to one.



Which of the following is a product of the reaction shown above?



Answer Key

Item Number	Correct Response	Subarea	Objective
1	C	I. Thermodynamics	0010
2	D	II. Chemical Bonding	0012
3	A	II. Chemical Bonding	0013
4	B	III. Chemical Reactions	0016
5	C	III. Chemical Reactions	0018

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