Chemistry (Grades 9–12)

Subtest 1 Sample Items

1. Which of the following mathematical equations would be most helpful to a chemist trying to determine the age of a bone found at an archeological site?

A. $\ln(A/A_0) = -kt$
B. $y = mx + b$
C. $\Delta G = \Delta H - T\Delta S$
D. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

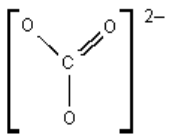
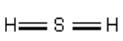
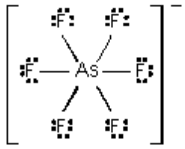
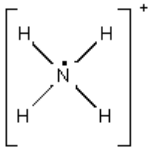
2. A chemistry teacher plans the student activities listed below as part of a new unit of study.

• comparing new terminology with related terminology from previous units
• developing nonverbal representations (e.g., charts, illustrations) of new terminology
• classifying new terminology according to specific criteria
• generating analogies with new terminology

These activities are likely to promote students' reading comprehension related to this unit primarily in which of the following ways?

A. by providing the students with strategies for determining the meaning of unfamiliar vocabulary as they read
B. by promoting the students' ability to decode and spell new vocabulary words accurately
C. by teaching the students how to use structural analysis as a strategy for building domain-specific vocabulary
D. by broadening the students' understanding of new vocabulary words and their associated concepts

3. Which of the following compounds is paired with its correct Lewis dot structure?

A. CO_3^{2-} 
B. H_2S 
C. AsF_6^- 
D. NH_4^+ 

4. An ionic compound is most likely to form when a Group 1 element is reacted with an element from Group:

A. 2.
B. 6.
C. 11.
D. 17.

5. $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(\ell)$ $\Delta H = -890.3$ kJ

Given the balanced equation for the combustion of methane shown above, how many moles of methane would need to be reacted in order to produce 3561 kJ of energy?

A. 2
B. 4
C. 8
D. 16

Answer Key

Item Number	Correct Response	Subarea	Objective
1	A	I. Chemistry Research and Applications	0002
2	D	I. Chemistry Research and Applications	0003
3	C	II. Matter and Atomic Structure	0004
4	D	II. Matter and Atomic Structure	0005
5	B	III. Stoichiometry	0008

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