QUIZ ANSWER KEY

Enthalpies of Formation and Reaction

1. B

2. B; D

3. The standard enthalpy of the reaction can be calculated based on the equation
$\Delta H° = \Delta H_f°(\text{products}) – \Delta H_f°(\text{reactants})$

$\Delta H_f°(\text{products}) = [-285.8 + (-393.5)] \times 6 = -4075.8$ kJ/mol
$\Delta H_f°(\text{reactants}) = -1271$ kJ/mol
$\Delta H° = -4075.8 \text{ kJ/mol} - (-1271 \text{ kJ/mol}) = 2804.8$ kJ/mol

Rubric:

1 pt: The student correctly writes the equation for calculation of standard enthalpy of a reaction, $\Delta H° = \Delta H_f°(\text{products}) – \Delta H_f°(\text{reactants})$ OR $\Delta H° = -4075.8 \text{ kJ/mol} - (-1271 \text{ kJ/mol})$.

1 pt: The student correctly computes/identifies the standard enthalpy of the reaction as 2804.8 kJ/mol.

1 pt: The student uses the correct units in the answer.

4. The enthalpy for the reaction between the solid form of carbon and water vapor can be calculated by adding the given steps of reaction. The mathematical equation will be $\Delta H° = \Delta H_1° + \Delta H_2°$. So, this translates to 483.6kJ + (−393.5 kJ) = 90.1 kJ. The value of enthalpy of the reaction is positive, so it can be predicted that the reaction is endothermic. This means heat will be absorbed during the reaction.

Rubric:

1 pt: The student identifies the correct answer as 90.1 kJ.

1 pt: The student identifies that heat will be absorbed during the reaction.

5. B