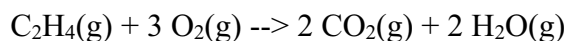


A.P. Chemistry
Thermochemistry Test

Multiple Choice (NO CALCULATOR!)

1. A gas sample is heated with 1020 J. The gas in the cylinder expands doing 820 J of work. What is the change in internal energy (E), in J, of the system?
A) 1840
B) -200
C) 1.24
D) 8.36×10^5
E) 200
2. Which of the following conditions would always result in an increase in the internal energy of a system?
A) the system loses heat and does work on the surroundings
B) the system gains heat and does work on the surroundings
C) the system loses heat and has work done on it by the surroundings
D) the system gains heat and has work done on it by the surroundings
E) none of the above is correct
3. A _____ ΔH corresponds to an _____ process.
A) negative, endothermic
B) positive, exothermic
C) positive, endothermic
D) zero, exothermic
E) zero, endothermic



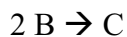
4. For the reaction of ethylene represented above, ΔH is - 1,323 kJ. What is the value of ΔH for the reaction if the combustion produced liquid water $\text{H}_2\text{O}(\text{l})$, rather than water vapor $\text{H}_2\text{O}(\text{g})$? (ΔH for the phase change $\text{H}_2\text{O}(\text{g}) \rightarrow \text{H}_2\text{O}(\text{l})$ is -44 kJ mol^{-1} .)
A) -1,235 kJ
B) -1,279 kJ
C) -1,323 kJ
D) -1,367 kJ
E) -1,411 kJ

5. For which of the following reactions is ΔH_{rxn} equal to the heat of formation of the product?
- A) $\text{N}_2 (\text{g}) + 3 \text{H}_2 (\text{g}) \rightarrow 2 \text{NH}_3 (\text{g})$
 - B) $\frac{1}{2} \text{N}_2 (\text{g}) + \text{O}_2 (\text{g}) \rightarrow \text{NO}_2 (\text{g})$
 - C) $6 \text{C} (\text{s}) + 6 \text{H} (\text{g}) \rightarrow \text{C}_6\text{H}_6 (\text{l})$
 - D) $\text{P} (\text{g}) + 4 \text{H} (\text{g}) + \text{Br} (\text{g}) \rightarrow \text{PH}_4\text{Br} (\text{l})$
 - E) $12 \text{C} (\text{g}) + 11 \text{H}_2 (\text{g}) + 11 \text{O} (\text{g}) \rightarrow \text{C}_6\text{H}_{22}\text{O}_{11} (\text{g})$

6. Consider the following two reactions:

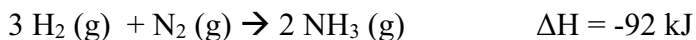


Determine the enthalpy change for the process:



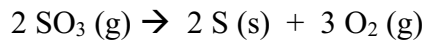
- A) -478.8 kJ
 - B) -434.6 kJ
 - C) 434.6 kJ
 - D) 478.8 kJ
 - E) more information is needed to solve the problem
7. The units of specific heat are _____.
- A) K/J or °C/J
 - B) J/K or J/°C
 - C) J/g-K or J/g-°C
 - D) J/mol
 - E) g-K/J or g-°C/J

8. Given only the following data, what can be said about the following reaction?



- A) The enthalpy of the products is greater than the enthalpy of the reactants.
- B) The total bond energies of the products is greater than the total bond energy of the reactants.
- C) The reaction is very fast.
- D) Nitrogen and hydrogen have very stable bonds compared to the bonds of ammonia.
- E) The reaction is endothermic.

9. The enthalpy of formation of gaseous sulfur trioxide is -396 kJ/mol. What is the enthalpy of the reaction represented by the following balanced equation?



- A) - 396 kJ
B) +396 kJ
C) + 792 kJ
D) -792 kJ
E) +198 kJ
10. For which of the following processes is the value of ΔH expected to be negative?
- I. The temperature increases when calcium chloride dissolves in water.
 - II. Steam condenses to liquid water.
 - III. Water freezes.
 - IV. Dry ice sublimates.
- A) IV only
B) I, II, and III
C) I only
D) II and III only
E) I and II only