Question 8

Find the standard enthalpy of formation of ethylene, $C_2H_4(g)$, given the following data:
$C_2H_4(g) + 3\ O_2(g)$ ----> $2\ CO_2(g) + 2\ H_2O(l)$ $\Delta H^o_f = -1411$ kJ;
$C(s) + O_2(g)$ ----> $CO_2(g)$ $\Delta H^o_f = -393.5$ kJ;
$H_2(g) + \frac{1}{2}O_2(g)$ ----> $H_2O(l)$ $\Delta H^o_f = -285.8$ kJ

- **A)** 731 kJ
- **B)** 2.77×10^3 kJ
- **C)** 1.41×10^3 kJ
- **D)** 87 kJ
- **E)** 52 kJ

Question 9

Calculate ΔH^o_{rxn} for the combustion reaction of CH_4 shown below given the following:
$\Delta H^o_f\ CH_4(g) = -74.8$ kJ/mol;
$\Delta H^o_f\ CO_2(g) = -393.5$ kJ/mol;
$\Delta H^o_f\ H_2O(l) = -285.5$ kJ/mol.
$CH_4(g) + 2\ O_2(g)$ ----> $CO_2(g) + 2\ H_2O(l)$

- **A)** -604.2 kJ
- **B)** 889.7 kJ
- **C)** -997.7 kJ
- **D)** -889.7 kJ
- **E)** None of the above

Question 10

A 1.300 g sample of benzoic acid ($C_7H_6O_2$) was burned in a bomb calorimeter. The heat capacity of the entire apparatus, including the bomb, pail, thermometer, and water, was found to be 11,145 J/K. As a result of the reaction, the temperature of the calorimeter and water increased 4.627 K. What is the molar heat of combustion of benzoic acid?

- **A)** 4.84×10^6 kJ/mol
- **B)** -2.96 kJ/mol
- **C)** -4844 kJ/mol
- **D)** 549.1 kJ/mol
- **E)** 51.57 kJ/mol

Question 11

Which of the following is incorrectly matched?

- **A)** Radiant energy; solar energy able to influence global climate patterns
- **B)** Thermal energy; related to temperature irrespective of the volume
- **C)** Energy; capacity to do work
- **D)** Chemical energy; potential energy

Question 12

Energy is the ability to do work and can be:

- **A)** converted to one form to another
- **B)** can be created and destroyed
- **C)** used within a system without consequences
- **D)** none of the above

Question 13

Standard enthalpy of reactions can be calculated from standard enthalpies of formation of reactants.

- **A)** True
- **B)** False

Question 14

In the equation ΔE is equal to $q+w$, which sign is correctly associated?

- **A)** q; - exothermic
- **B)** q; + endothermic
- **C)** w; + by system on surrounding
- **D)** w; + on system by surroundings