

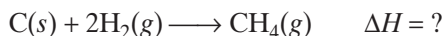


# Standardized Test Prep

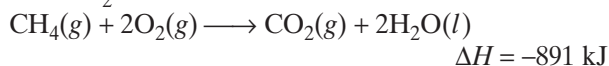
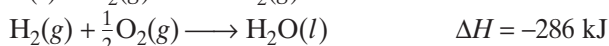
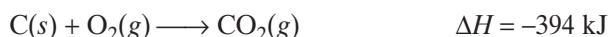
Answer the following items on a separate piece of paper.

## MULTIPLE CHOICE

- Which of the following two conditions will favor a spontaneous reaction?
  - an increase in entropy and a decrease in enthalpy
  - an increase in entropy and an increase in enthalpy
  - a decrease in entropy and a decrease in enthalpy
  - a decrease in entropy and an increase in enthalpy
- The gasification of coal is a method of producing methane by the following reaction.



Find  $\Delta H$  by using the enthalpy changes in the following combustion reactions



- 75 kJ
  - 75 kJ
  - 1856 kJ
  - 1856 kJ
- Two metals of equal mass but different specific heats absorb the same amount of heat. Which metal undergoes the smaller change in temperature?
    - The metal with the higher specific heat.
    - The metal with the lower specific heat.
    - Both undergo the same change in temperature.
    - Cannot determine from the information given.
  - Which of the following processes has a negative  $\Delta S$ ?
    - evaporating 1 mol of a liquid
    - raising the temperature of 1 L of water from 295 K to 350 K
    - freezing of 1 mol of a liquid
    - None of the above

- At a constant pressure, the following reaction is exothermic:  $2\text{NO}_2(g) \longrightarrow \text{N}_2\text{O}_4(g)$ . Which of the following statements is true about the reaction (as written)?

- The reaction is always spontaneous.
- The reaction is spontaneous at low temperatures, but not at high temperatures.
- The reaction is spontaneous at high temperatures, but not at low temperatures.
- The reaction is never spontaneous.

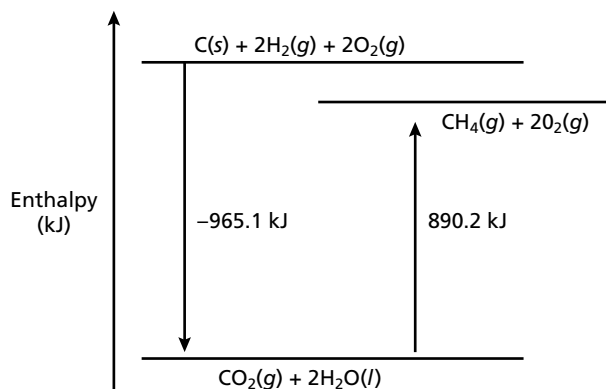
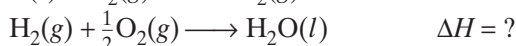
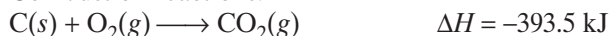
## SHORT ANSWER

- For a reaction in which a diatomic molecule dissociates into atoms, what are the signs of  $\Delta S$  and  $\Delta H$ ? Explain your answer. You may use the reaction  $\text{N}_2(g) \longrightarrow 2\text{N}(g)$  as an example of such a reaction.

## EXTENDED RESPONSE

- For certain molecules, enthalpies of formation can be determined from combustion data. Using the diagram below, calculate the enthalpy of formation of methane gas,  $\text{CH}_4(g)$ , and the enthalpies for two of the combustion reactions listed below.

Combustion reactions:



## Test TIP

Always read the question before looking at the answer choices.