

Name: _____

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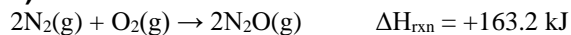
Directions: Show all work in a way that would earn you credit on the AP Test! This is always the rule! Some answers are provided at the end in italics and underlined. If you need more space, use binder paper and staple to your worksheet.

SET A 20 MINUTE TIMER AND SEE IF YOU FINISH ON TIME!

$$\Delta H^\circ = \sum \Delta H_f^\circ \text{ products} - \sum \Delta H_f^\circ \text{ reactants}$$

1) Answer the following questions about the reaction of nitrogen gas and oxygen gas.

a) Calculate the amount of heat transferred when 10.00 g of N₂O(g) is formed by the following reaction:



b) Draw and label an energy diagram for this process.

18.54 kJ

2) Predict the (+) or (-) algebraic sign for ΔH_f° for the following scenarios and explain why. *HINT* Think about what the standard form/phase is for each substance, if you don't know what it is then look it up!

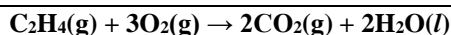
a) Br₂(g)

c) I₂(g)

b) Br₂(l)

d) I₂(s)

3) Calculate the $\Delta H_{\text{rxn}}^\circ$ for the following reaction:



$$\Delta H_f^\circ \text{ C}_2\text{H}_4(\text{g}) = 226.6 \text{ kJ/mol}$$

$$\Delta H_f^\circ \text{ CO}_2(\text{g}) = -393.5 \text{ kJ/mol}$$

$$\Delta H_f^\circ \text{ H}_2\text{O}(\text{l}) = -285.8 \text{ kJ/mol}$$

-1585.2 kJ/mol

Dougherty Valley HS Chemistry - AP
Thermochemistry – Timed Practice Quiz

- 4) A 5.00 g sample of liquid water at 25.0°C is heated by the addition of 84.0 J of energy. Determine the final temperature of the water in °C? (The specific heat capacity of the liquid is 4.18 J/g°C).

29.0°C

- 5) Propane is a hydrocarbon that is commonly used as a fuel for cooking. Propane's formula is C₃H₈.

a) Write a balanced equation for the complete combustion of propane gas.

b) Calculate the volume of air at 30°C and 1.00 atm that is needed to burn completely 10.0 g of propane. Assume that air is 21.0% O₂ by volume.

134 L air

c) The heat of combustion ($\Delta H_{\text{combustion}}^{\circ}$) is -2,220.1 kJ/mol. Calculate the heat of formation, ΔH_f° , of propane given that ΔH_f° of H₂O(l) is -285.3 kJ/mol and ΔH_f° of CO₂(g) is -393.5 kJ/mol.

-101.6 kJ/mol

d) Assuming that all of the heat evolved burning 10.0 g propane is transferred to 8.00 kg of water (specific heat = 4.184 J/g°C), calculate the increase in temperature of the water.

15.0°C is ΔT