Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_\_

**Potential Energy Diagrams, Thermochemical Equations, &Thermochemistry Dimensional Analysis**

1. Use the following Potential Energy Diagram to the right for questions a-h
2. Is this reaction **endothermic / exothermic**?
3. How much stored P.E. do the reactants have? ­­\_\_\_\_\_\_\_
4. How much stored P.E. do the products have? \_\_\_\_\_\_\_\_\_
5. How much activation energy, Ea, is needed for this reaction? \_\_\_\_\_\_\_\_\_\_\_\_
6. To get from the reactants to the products, energy had to be **added / removed**. How much? \_\_\_\_\_\_\_\_\_
7. How much P.E. must be added to the reactants to form the activated complex? \_\_\_\_\_\_\_\_\_\_\_\_
8. What is the value of ΔH or ΔHrxn? \_\_\_\_\_\_\_\_\_\_\_\_
9. Is ΔHrxn positive or negative? \_\_\_\_\_\_\_\_\_\_\_\_\_
10. Use the Potential Energy Diagram to the left for questions a-f
11. Is this reaction **endothermic / exothermic**?
12. Which line segment represents the stored P.E. of the reactants? \_\_\_\_
13. Which line segment represents the stored P.E. of the products? \_\_\_\_\_
14. Which line segment represents the activation energy, Ea, that is needed for this reaction? \_\_\_\_\_\_\_\_
15. Which line segment represents the ΔH (change in P.E.) for the reaction? \_\_\_\_\_\_\_ Is it **positive / negative?** \_\_\_\_\_\_\_\_\_
16. Which line segment represents the P.E. of the activated complex? \_\_\_\_
17. To the right, draw a reaction path diagram with the following criteria:
	* an exothermic reaction
	* reactants have 250kJ of potential energy stored in their bonds
	* 100kJ of activation energy required
	* products have 50kJ of potential energy stored in their bonds
	* Scale and label the y axis for kJ of potential energy.
	* Calculate $∆H$ = \_\_\_\_\_\_\_\_\_\_\_\_\_
18. Write a thermochemical equation based off the information found in the energy path diagram below.
19. Write the following reactions with the change in enthalpy as a reactant or product.

Fe + CO2 🡪 Fe2O3 + CO ΔH = + 26.3 kJ

1. In the thermochemical equations below, the energy has been written on the reactants side or the products side. Write the energy as a ΔH value with the correct sign for the reaction below.

 CrO3 + H2O 🡺 H2CrO4 + 5.4 kJ

1. Compute the heat change for the production of 150 g iron (III) oxide in the following equation:

 4FeO + O2 🡺 2Fe2O3 + 560kJ

1. How many molecules (particles) of carbon dioxide are produced by the decomposition of Nitroglycerin?

 4C3H5(NO3)3 → 6N2 + O2 + 12CO2 + 10H2O + 1804 kJ