Potential Energy Diagram Worksheet **ANSWERS**

1. Which of the letters a–f in the diagram represents the potential energy of the products? __e__

2. Which letter indicates the potential energy of the activated complex? ___c____

3. Which letter indicates the potential energy of the reactants? ___a____

4. Which letter indicates the activation energy? __b__

5. Which letter indicates the heat of reaction? __f__

6. Is the reaction exothermic or endothermic? _endo_

7. Which letter indicates the activation energy of the reverse reaction? ___d___

8. Which letter indicates the heat of reaction of the reverse reaction? ___f___

9. Is the reverse reaction exothermic or endothermic? __exo__

1. The PE of the reactants of the forward reaction is about ___80___ kilojoules.
2. The PE of the products of the forward reaction is about ___160___ kilojoules.
3. The PE of the activated complex of the forward reaction is about ___240___ kilojoules.
4. The activation energy of the forward reaction is about ___160___ kilojoules.
5. The heat of reaction (\(\Delta H\)) of the forward reaction is about ___+80___ kilojoules.
6. The forward reaction is ____endothermic______

7. The PE of the reactants of the reverse reaction is about ___160___ kilojoules.
8. The PE of the products of the reverse reaction is about ___80___ kilojoules.
9. The PE of the activated complex of the reverse reaction is about ___240___ kilojoules.
10. The activation energy of the reverse reaction is about ___80___ kilojoules.
11. The heat of reaction (\(\Delta H\)) of the reverse reaction is about ___-80___ kilojoules.
12. The reverse reaction is ____exothermic______ (endothermic or exothermic).
Reaction Rates and Potential Energy Diagrams

1. Chemical reactions occur when reactants collide. For what reasons may a collision fail to produce a chemical reaction?

   Not enough energy; improper angle.

2. If every collision between reactants leads to a reaction, what determines the rate at which the reaction occurs?

   Nature of reactants, Concentration, Temperature, Catalysts.

3. What is the activation energy of a reaction, and how is this energy related to the activated complex of the reaction?

   Ea is the minimum amount of energy for a reaction to occur. It is the amount of energy required to create an activated complex.

4. What happens when a catalyst is used in a reaction?

   A catalyst changes the reaction mechanism, in the process lowering the activation energy.

5. Name 4 things that will speed up or slow down a chemical reaction.

   Increase concentration by distillation of a solvent, Increase concentration by increasing pressure of a gas, Increase temp, Add a catalyst, Add an inhibitor.

6. Draw an energy diagram for a reaction. Label the axis, PE of reactants = 350 KJ/mol, Ea = 100 KJ/mol, PE of products = 250 KJ/mol.

   ![Reaction Energy Diagram]

7. Is the reaction in #6 exothermic or endothermic? Explain.

   Exothermic. The ΔH is -100 KJ/mol which means heat is released.

8. How could you lower the activation energy for the reaction in #6?

   Add a catalyst.