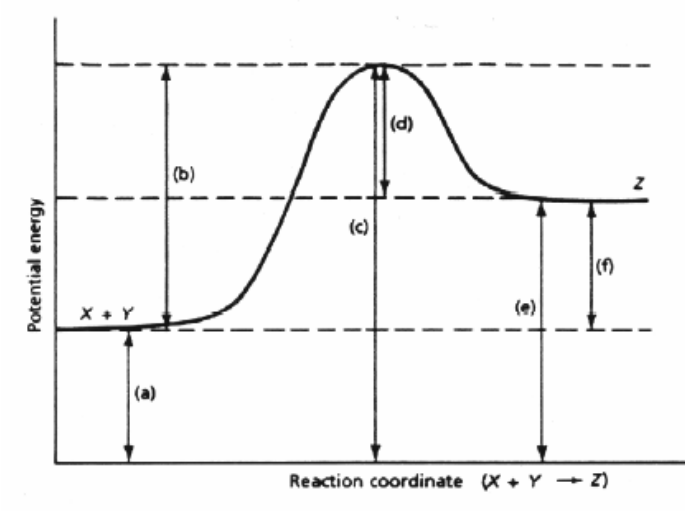
Potential Energy Diagrams Practice

Name:_____



1. Which letter (a–f) represents potential energy (ΔH) of the products? _____

2. Which letter (a-f) represents potential energy (ΔH) of the activated complex? _____

3. Which letter (a-f) represents potential energy (ΔH) of the reactants? _____

4. Which letter (a-f) represents activation energy (E_a) of the forward reaction (reactants)? _____

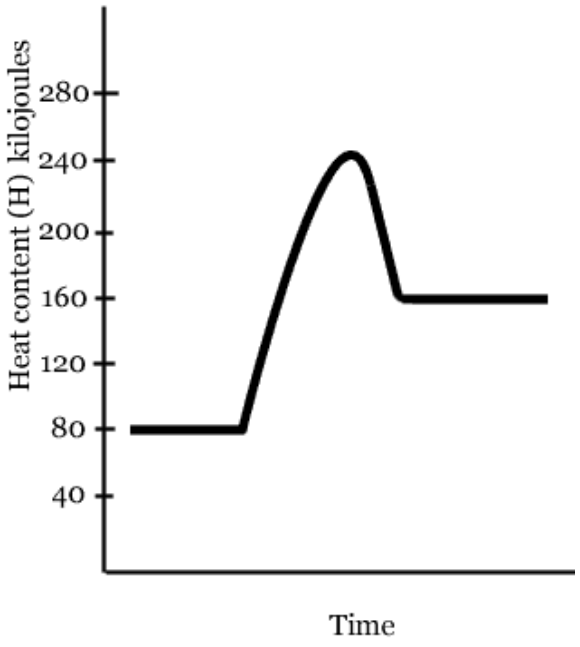
5. Which letter (a-f) represents heat of reaction (ΔH_{Rxn}) of the forward reaction? _____

6. Is the forward reaction endothermic or exothermic? _____

7. Which letter (a-f) represents activation energy (E_a) of the reverse reaction (products)? _____

8. Which letter (a-f) represents heat of reaction (ΔH_{Rxn}) of the reverse reaction? _____

9. Is the reverse reaction endothermic or exothermic? _____



10. The potential energy (ΔH) of the reactants in the forward reaction is about _____ kilojoules (kJ).

11. The potential energy (ΔH) of the products in the forward reaction is about _____kilojoules (kJ).

12. The potential energy (ΔH) of the activated complex in the forward reaction is about _____ kilojoules (kJ).

13. The activation energy (E_a) of the forward reaction (reactants) is about _____ kilojoules (kJ).

14. The forward reaction is _____ (endothermic or exothermic).

15. The potential energy (ΔH) of the reactants in the reverse reaction is about _____ kilojoules (kJ).

16. The potential energy (ΔH) of the products in the reverse reaction is about _____ kilojoules (kJ).

17. The potential energy (ΔH) of the activated complex in the reverse reaction is about _____kilojoules (kJ).

18. The activation energy (E_a) of the reverse reaction (products) is about _____ kilojoules (kJ).

19. The reverse reaction is _____ (endothermic or exothermic).

PART C – REACTION RATES (KINETICS)

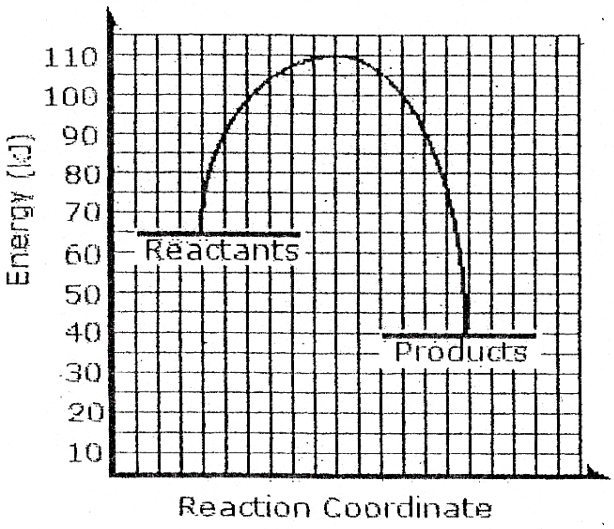
Place an "X" next to each action that would most likely INCREASE the reaction rate.

1. _____ Lowering the temperature of the reactants.
2. _____ Dissolving two solids in water before mixing them together.
3. _____ Diluting an aqueous solution of HCl with water before adding a piece of magnesium.
4. _____ Grinding a solid into fine particles.
5. _____ Adding an enzyme catalyst.

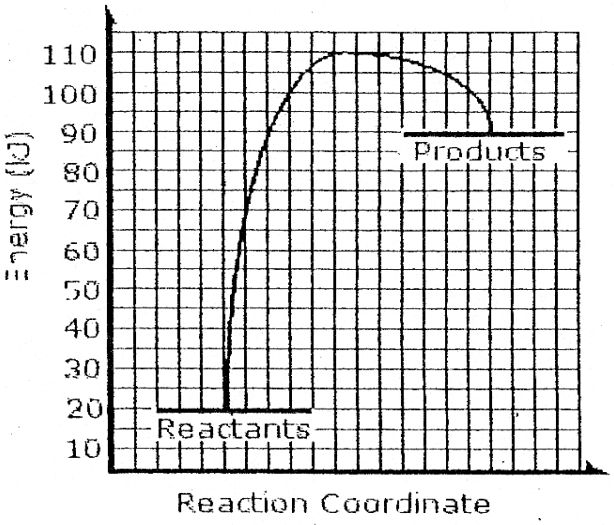
PART D – CREATING A POTENTIAL ENERGY DIAGRAM

NOTE: For each example, Activation Energy ***(E_a)*** is for the ***forward*** reaction, and will always drop down to the reactants.
NOTE: For each reaction, ΔH is the enthalpy of the reaction ***(ΔH_{Rxn})*** of the ***forward*** reaction.

For the following graphs, draw arrows and calculate the values of ΔH and E_a.

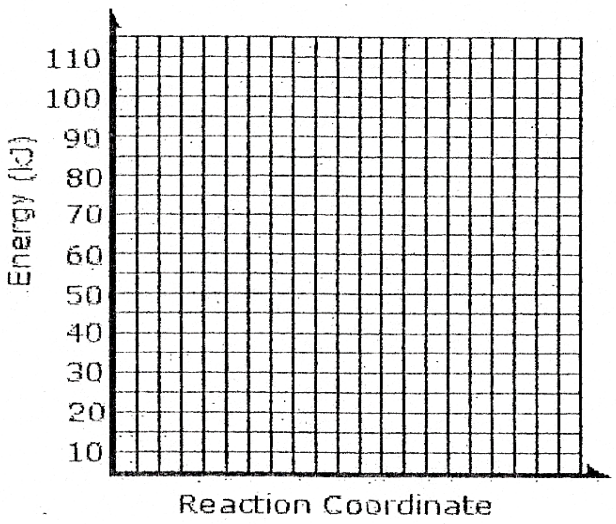


1) ΔH = E_a =

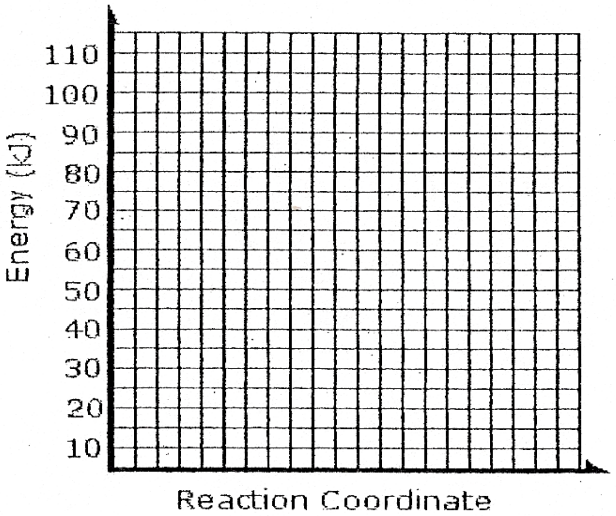


2) ΔH = E_a =

On the following graphs draw a reaction coordinate for a reaction that fits the given descriptions



3) ΔH = -50 kJ, Ea = 20 kJ



4) ΔH = 20 kJ, Ea = 80 kJ

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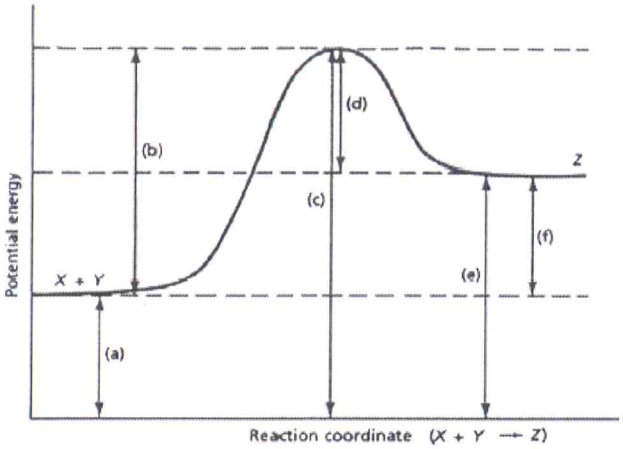

1. Which letter (a–f) represents potential energy (ΔH) of the products? e

2. Which letter (a-f) represents potential energy (ΔH) of the activated complex? c

3. Which letter (a-f) represents potential energy (ΔH) of the reactants? a

4. Which letter (a-f) represents activation energy (E_a) of the forward reaction (reactants)? b

5. Which letter (a-f) represents heat of reaction (ΔH_{Rxn}) of the forward reaction? f

6. Is the forward reaction endothermic or exothermic? endothermic

7. Which letter (a-f) represents activation energy (E_a) of the reverse reaction (products)? d

8. Which letter (a-f) represents heat of reaction (ΔH_{Rxn}) of the reverse reaction? f

9. Is the reverse reaction endothermic or exothermic? exothermic

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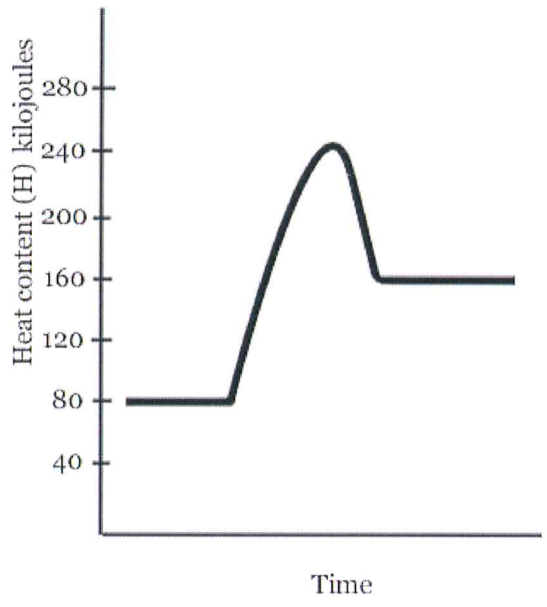


10. The potential energy (ΔH) of the reactants in the forward reaction is about 80 kilojoules (kJ).

11. The potential energy (ΔH) of the products in the forward reaction is about 160 kilojoules (kJ).

12. The potential energy (ΔH) of the activated complex in the forward reaction is about 240 kilojoules (kJ).

13. The activation energy (E_a) of the forward reaction (reactants) is about 160 kilojoules (kJ).

14. The forward reaction is Endothermic (endothermic or exothermic).

15. The potential energy (ΔH) of the reactants in the reverse reaction is about 160 kilojoules (kJ).

16. The potential energy (ΔH) of the products in the reverse reaction is about 80 kilojoules (kJ).

17. The potential energy (ΔH) of the activated complex in the reverse reaction is about 240 kilojoules (kJ).

18. The activation energy (E_a) of the reverse reaction (products) is about 80 kilojoules (kJ).

19. The reverse reaction is Exothermic (endothermic or exothermic).

PART C – REACTION RATES (KINETICS)

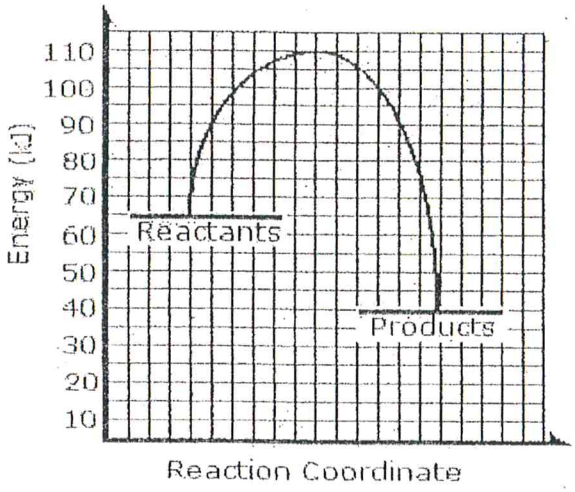
Place an "X" next to each action that would most likely INCREASE the reaction rate.

1. _____ Lowering the temperature of the reactants.
2. _X_ Dissolving two solids in water before mixing them together.
3. _____ Diluting an aqueous solution of HCl with water before adding a piece of magnesium.
4. _X_ Grinding a solid into fine particles.
5. _X_ Adding an enzyme catalyst.

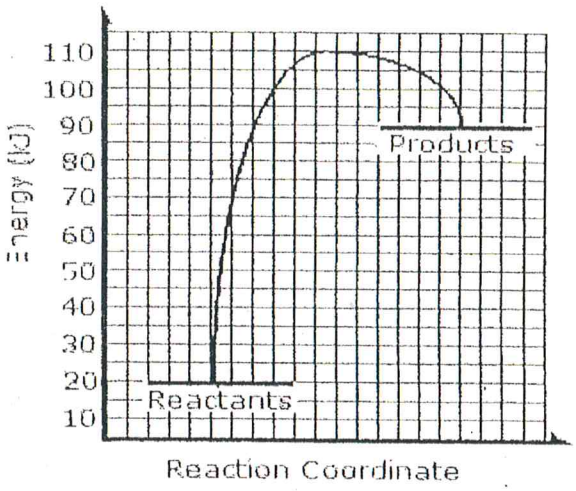
PART D – CREATING A POTENTIAL ENERGY DIAGRAM

NOTE: For each example, Activation Energy ***(E_a)*** is for the ***forward*** reaction, and will always drop down to the reactants.
NOTE: For each reaction, ΔH is the enthalpy of the reaction ***(ΔH_{Rxn})*** of the ***forward*** reaction.

For the following graphs, draw arrows and calculate the values of ΔH and E_a.

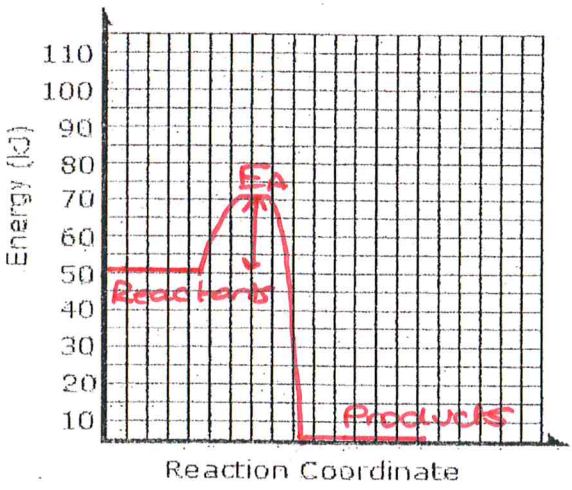


1) ΔH = -25kJ E_a = 45kJ

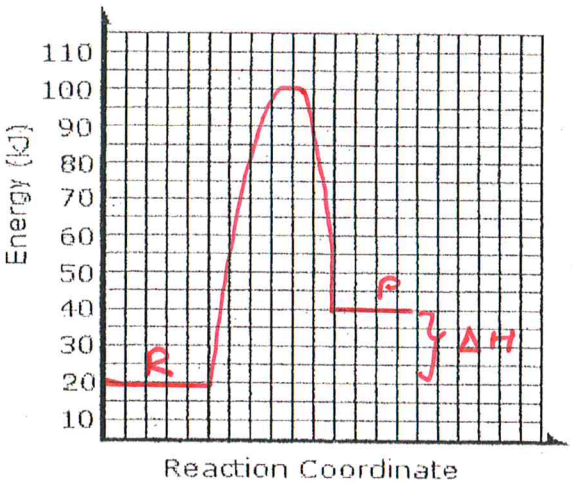


2) ΔH = 70kJ E_a = 90kJ

On the following graphs draw a reaction coordinate for a reaction that fits the given descriptions



3) ΔH = -50 kJ, Ea = 20 kJ



4) ΔH = 20 kJ, Ea = 80 kJ