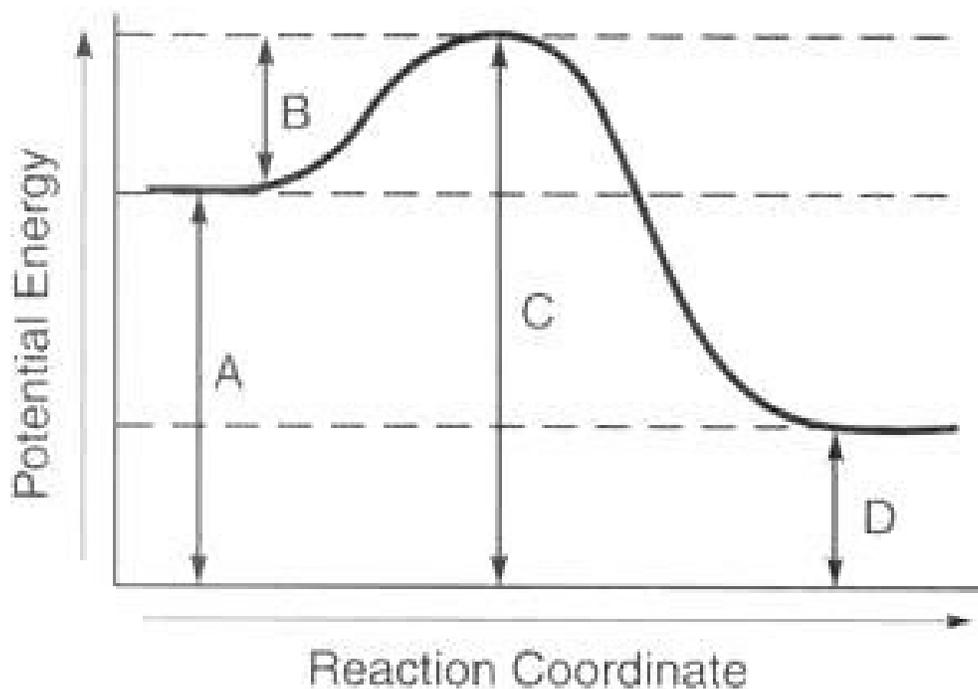


PE units are kilojoules A = 80 kJ B = ?? C = 100 kJ D = 20 kJ

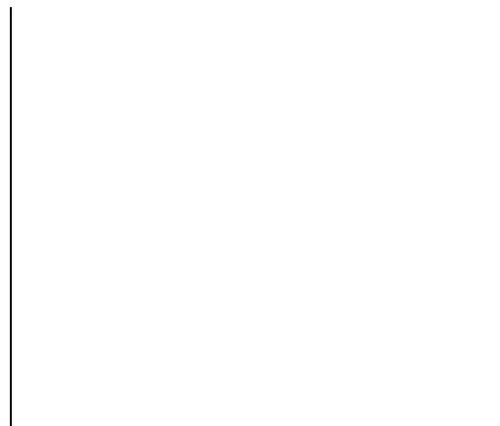


Use the potential energy diagram to answer the questions below.

1. What is the potential energy of the reactants in kJ/mol?
2. What is the potential energy of the products in kJ/mol?
3. Is this reaction exothermic or endothermic?
4. What is the heat of reaction in this graph?
5. Would the energy of reaction be written with the products or the reactants for this thermochemical equation?
6. Would the ΔH for the reaction change if a catalyst was added?
7. What is the potential energy in kJ/mol of the activated complex?
8. What is the activation energy for this reaction?
9. Does the activation energy change if a catalyst is added to the system?
10. Estimate the activation energy if a catalyst is used here.

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1 + 2 Draw two complete POTENTIAL ENERGY diagrams for an exothermic and an endothermic reaction. Include titles, axis labels, curves, AE, AC, ΔH , catalyst dotted line, "R" + "P" for reactants and products, and state ENDOTHERMIC OR EXOTHERMIC in each title.



3. Explain the difference between a catalyst & an inhibitor in a chemical reaction.

Assuming you have this dynamic equilibrium reaction, show with arrows which way the reaction shifts with each stress that we apply to it. The first one is done for you to show you an arrow.



Add butane →
Add carbon dioxide

Add heat
Decrease pressure

Add oxygen
Remove carbon dioxide

Remove heat
Remove butane

Increase pressure
Add a catalyst

Remove oxygen
Add carbon dioxide

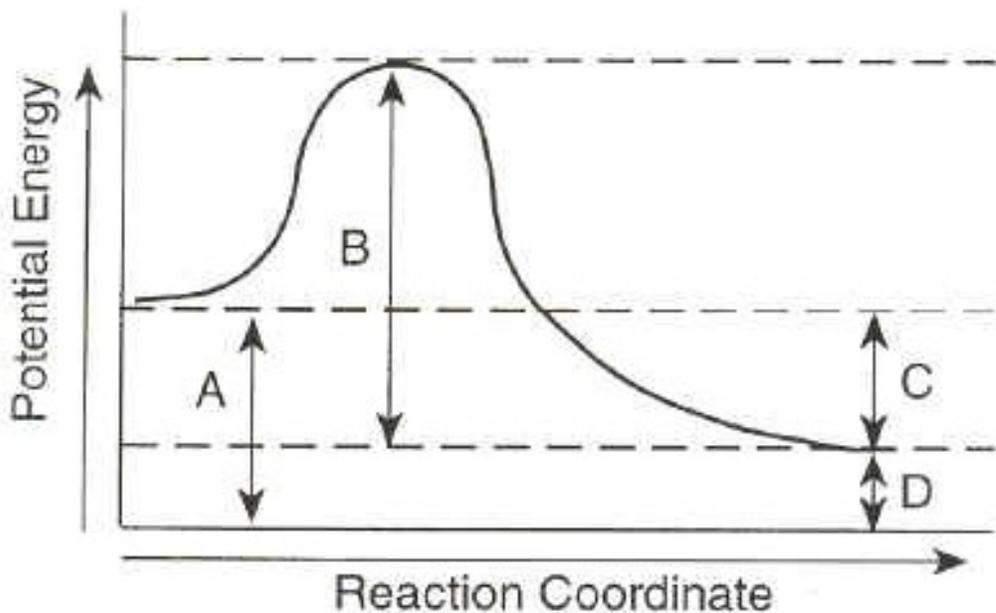
Remove water
Add water

This graph below from an old regents exam expects you to think about potential energy diagrams.

The letters have these values: A = 30 kJ/mol B = 50 kJ/mol C = 20 kJ/mol D = 10 kJ/mol

Use **NUMERIC VALUES**, not letters.

1. What is the potential energy of the reactants?
2. What is the potential energy of the products?
3. What is the potential energy of the activated complex?
4. Is the ΔH positive or negative?
5. What is the heat of reaction from this graph?
6. How much energy is required to start this reaction?
7. What is this energy in question #6 called?
8. Is this reaction endothermic or exothermic?
9. Could the reaction: $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ be represented by a diagram with this shape? (yes or no)
10. Define Heat of Solution. (below)



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