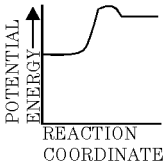
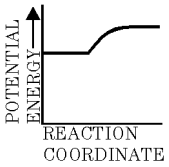
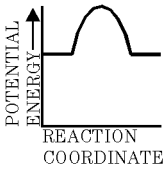
Monday Review Christmas Break

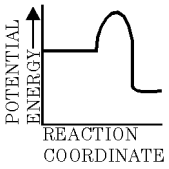
Name: _____ **Date:** _____

1. Which diagram represents the potential energy of an exothermic reaction?

A. 

B. 

C. 

D. 

2. Which of the following best describes exothermic chemical reactions?

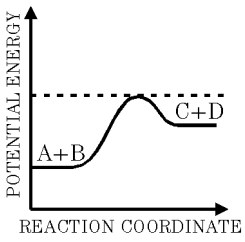
A. They never release heat.

B. They always release heat.

C. They never occur spontaneously.

D. They always occur spontaneously.

3. According to the potential energy diagram shown for the reaction $A + B \rightarrow C + D$, the activation energy is highest for the



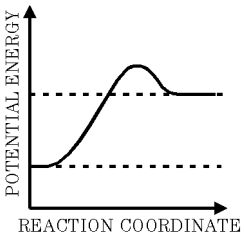
A. forward reaction, which is endothermic

B. forward reaction, which is exothermic

C. reverse reaction, which is endothermic

D. reverse reaction, which is exothermic

4. According to the potential energy diagram shown, the chemical reaction in the forward direction is



A. exothermic because it absorbs energy

B. exothermic because it releases energy

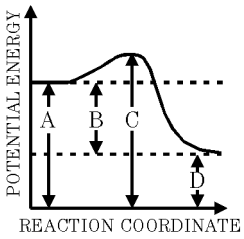
C. endothermic because it absorbs energy

D. endothermic because it releases energy

5. The graph shown represents the potential energy changes that occur in a chemical reaction. Which interval represents the ΔH of the reaction?

A. *A* B. *B*

C. *C* D. *D*

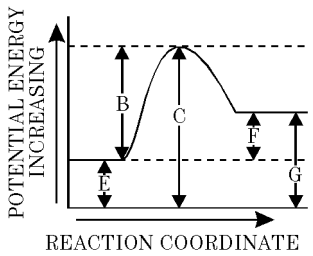


6. Which change of phase is endothermic?

A. $CO_2(g) \rightarrow CO_2(s)$ B. $H_2O(\ell) \rightarrow H_2O(s)$

C. $I_2(s) \rightarrow I_2(g)$ D. $H_2O(g) \rightarrow H_2O(\ell)$

7. Interval *B* represents the



A. potential energy of the products

B. potential energy of the reactants

C. activation energy

D. activated complex

8. Which change results in a release of energy?

A. the melting of $H_2O(s)$

B. the boiling of $H_2O(\ell)$

C. the evaporation of $H_2O(\ell)$

D. the condensation of $H_2O(g)$

9. A solid is dissolved in a beaker of water. Which observation suggests that the process is endothermic?

A. The solution gives off a gas.

B. The solution changes color.

C. The temperature of the solution decreases.

D. The temperature of the solution increases.

10. Which phase change results in a release of energy?

A. $Br_2(\ell) \rightarrow Br_2(s)$ B. $I_2(s) \rightarrow I_2(g)$

C. $H_2O(s) \rightarrow H_2O(\ell)$ D. $NH_3(\ell) \rightarrow NH_3(g)$

11. Which phase change is endothermic?

A. gas → solid B. gas → liquid

C. liquid → solid D. liquid → gas

12. Given the reaction:

$$Cl(g) + Cl(g) \rightarrow Cl_2(g) + \text{energy}$$

Which statement best describes the reaction?

A. A bond is formed and energy is absorbed.

B. A bond is formed and energy is released.

C. A bond is broken and energy is absorbed.

D. A bond is broken and energy is released.

13. Given the reaction:

$$H_2O(\ell) + 68.3\text{kcal} \rightleftharpoons H_2(g) + O_2(g)$$

Which statement describes the reverse reaction?

A. It is endothermic and releases 68.3 kilocalories.

B. It is endothermic and absorbs 68.3 kilocalories.

C. It is exothermic and releases 68.3 kilocalories.

D. It is exothermic and absorbs 68.3 kilocalories.

14. A student observed that when sodium hydroxide was dissolved in water, the temperature of the water increased. The student should conclude that the dissolving of sodium hydroxide

A. is endothermic

B. is exothermic

C. produces an acid solution

D. produces a salt solution

15. According to Reference Table G, which statement best describes the formation of HF(g)?

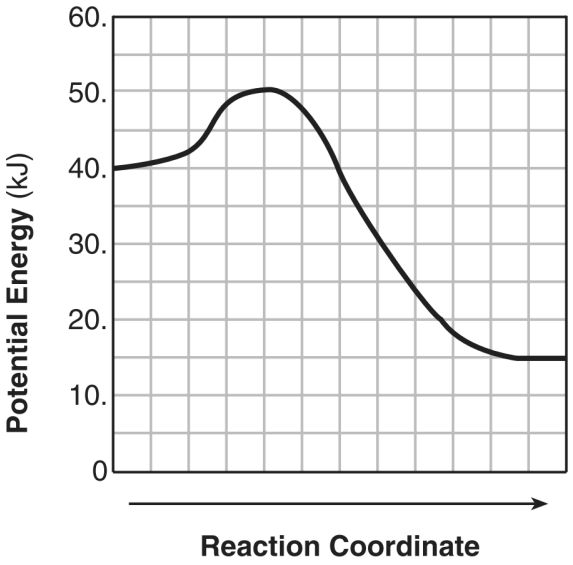
A. It is exothermic, and heat is released.

B. It is exothermic, and heat is absorbed.

C. It is endothermic, and heat is released.

D. It is endothermic, and heat is absorbed.

16. Given the potential energy diagram for a chemical reaction:



Which statement correctly describes the energy changes that occur in the forward reaction?

A. The activation energy is 10. kJ and the reaction is endothermic.

B. The activation energy is 10. kJ and the reaction is exothermic.

C. The activation energy is 50. kJ and the reaction is endothermic.

D. The activation energy is 50. kJ and the reaction is exothermic.

17. Which balanced equation represents an endothermic reaction?

A. $C(s) + O_2(g) \rightarrow CO_2(g)$

B. $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(\ell)$

C. $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

D. $N_2(g) + O_2(g) \rightarrow 2NO(g)$

18. Given the balanced equation:

$$I + I \rightarrow I_2$$

Which statement describes the process represented by this equation?

A. A bond is formed as energy is absorbed.

B. A bond is formed and energy is released.

C. A bond is broken as energy is absorbed.

D. A bond is broken and energy is released.

19. Given the balanced equation representing a reaction:

$$Cu + S \rightarrow CuS + \text{energy}$$

Which statement explains why the energy term is written to the right of the arrow?

A. The compound CuS is composed of two metals.

B. The compound CuS is composed of two nonmetals.

C. Energy is absorbed as the bonds in CuS form.

D. Energy is released as the bonds in CuS form.

20. Which process is exothermic?

A. boiling of water

B. melting of copper

C. condensation of ethanol vapor

D. sublimation of iodine

21. Which statement is true concerning the reaction $N(g) + N(g) \rightarrow N_2(g) + \text{energy}$?

A. A bond is broken and energy is absorbed.

B. A bond is broken and energy is released.

C. A bond is formed and energy is absorbed.

D. A bond is formed and energy is released.

22. The potential energy possessed by a molecule is dependent upon

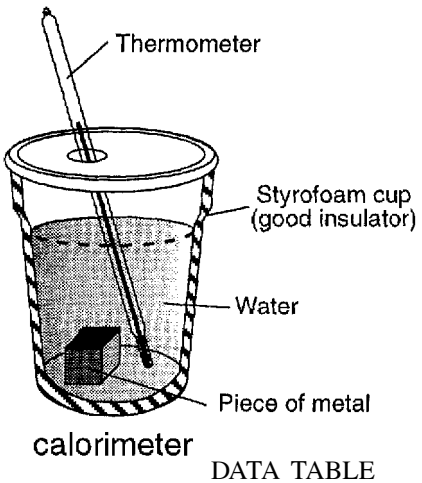
A. its composition, only

B. its structure, only

C. both its composition and its structure

D. neither its composition nor its structure

23.



calorimeter

DATA TABLE

Mass of H_2O	50.0 g
Initial temperature of H_2O	25.0° C
Mass of metal	20.0 g
Initial temperature of metal	100° C
Final temperature of H_2O + metal	32.0° C

A student using a Styrofoam cup as a calorimeter added a piece of metal to distilled water and stirred the mixture as shown in the diagram. The student's data is shown in the table. Which statement correctly describes the heat flow in calories? [Ignore heat gained or lost by the calorimeter.]

A. The water lost 1360 calories of heat and the metal gained 140 calories of heat.

B. The water lost 350 calories of heat and the metal gained 350 calories of heat.

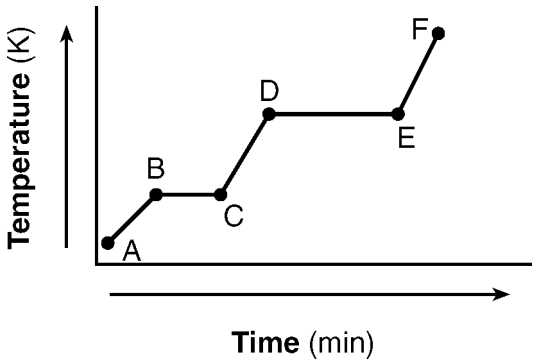
C. The water gained 1360 calories of heat and the metal lost 140 calories of heat.

D. The water gained 350 calories of heat and the metal lost 350 calories of heat.

24. Different masses of copper and iron have the same temperature. Compared to the average kinetic energy of the copper atoms, the average kinetic energy of the iron atoms is

A. less B. greater C. the same

25. Base your answer(s) to the following question(s) on the heating curve below, which represents a substance starting as a solid below its melting point and being heated at a constant rate over a period of time.



What is happening to the average kinetic energy of the particles during segment $\overline{BC}$?

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1.
Answer: D

2.
Answer: B

3.
Answer: A

4.
Answer: C

5.
Answer: B

6.
Answer: C

7.
Answer: C

8.
Answer: A

9.
Answer: C

10.
Answer: A

11.
Answer: D

12.
Answer: B

13.
Answer: C

14.
Answer: B

15.
Answer: A

16.
Answer: B

17.
Answer: D

18.
Answer: B

19.
Answer: D

20.
Answer: C

21.
Answer: D

22.
Answer: C

23.
Answer: D

24.
Answer: C

25.
Answer: remains the same
It does not change.