

Name: _____

Matter Extra Practice

1. Which equation represents a physical change?

- _____
- 1) $\text{H}_2\text{O}(\text{s}) \rightarrow \text{H}_2\text{O}(\ell)$
 - 2) $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$
 - 3) $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightarrow 2\text{HI}(\text{g})$
 - 4) $\text{N}_2(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow 2\text{NO}_2(\text{g})$

2. Which substance can be broken down by chemical means?

- _____
- 1) CO 2) Ce 3) Ca 4) C

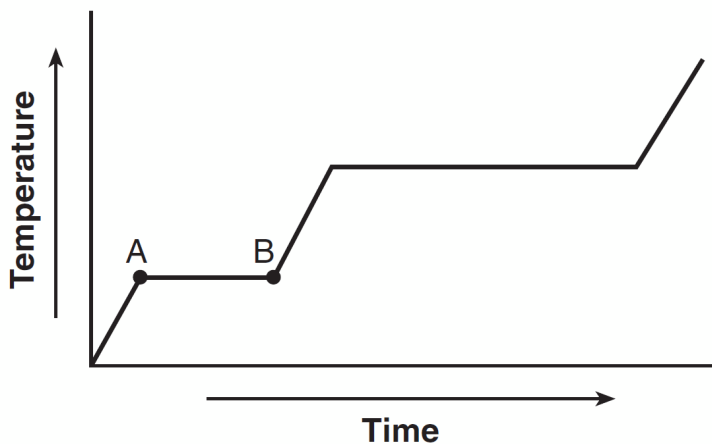
3. Which substance can't be broken down by chemical means?

- _____
- 1) CO 2) H_2O 3) Ca 4) HF

4. At STP, which physical property of aluminum always remains the same from sample to sample?

- _____
- 1) mass 3) length
 - 2) density 4) volume

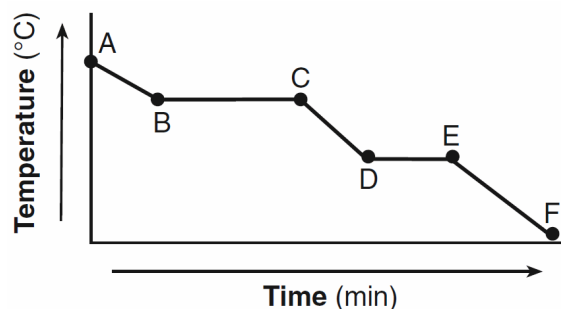
5. The graph below represents the relationship between time and temperature as heat is added at a constant rate to a sample of a substance.



During interval *AB* which energy change occurs for the particles in this sample?

- 1) The potential energy of the particles increases.
- 2) The potential energy of the particles decreases.
- 3) The average kinetic energy of the particles increases.
- 4) The average kinetic energy of the particles decreases.

6. Given the cooling curve of a substance:



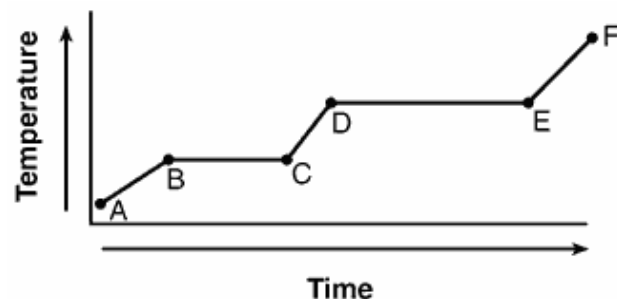
During which intervals is potential energy decreasing and average kinetic energy remaining constant?

- 1) AB and BC
- 2) AB and CD
- 3) DE and BC
- 4) DE and EF

7. Which physical changes are endothermic?

- 1) melting and freezing
- 2) melting and evaporating
- 3) condensation and sublimation
- 4) condensation and deposition

8. The graph below represents the uniform heating of a substance, starting with the substance as a solid below its melting point.



Which line segment represents an increase in potential energy and no change in average kinetic energy?

- 1) \overline{AB}
- 2) \overline{BC}
- 3) \overline{CD}
- 4) \overline{EF}

9. Which equation represents sublimation?

- 1) $\text{Hg}(\ell) \rightarrow \text{Hg}(\text{s})$
- 2) $\text{H}_2\text{O}(\text{s}) \rightarrow \text{H}_2\text{O}(\text{g})$
- 3) $\text{NH}_3(\text{g}) \rightarrow \text{NH}_3(\ell)$
- 4) $\text{CH}_4(\ell) \rightarrow \text{CH}_4(\text{g})$

10. Two grams of potassium chloride are completely dissolved in a sample of water in a beaker. This solution is classified as

- 1) an element
- 2) a compound
- 3) a homogeneous mixture
- 4) a heterogeneous mixture

11. Which formula represents a mixture?

- 1) $\text{C}_6\text{H}_{12}\text{O}_6(\ell)$
- 2) $\text{C}_6\text{H}_{12}\text{O}_6(\text{s})$
- 3) $\text{LiCl}(\text{aq})$
- 4) $\text{LiCl}(\text{s})$

12. Two substances in a mixture differ in density and particle size. These properties can be used to

- 1) separate the substances
- 2) chemically combine the substances
- 3) determine the freezing point of the mixture
- 4) predict the electrical conductivity of the mixture

13. A mixture of sand and table salt can be separated by filtration because the substances in the mixture differ in

- 1) boiling point
- 2) density at STP
- 3) freezing point
- 4) solubility in water

14. Which property makes it possible to separate the oxygen and the nitrogen from a sample of liquefied air?

- 1) boiling point
- 2) conductivity
- 3) hardness
- 4) electronegativity

15. Which statement describes a chemical property of aluminum?

- 1) Aluminum is malleable.
- 2) Aluminum reacts with sulfuric acid.
- 3) Aluminum conducts an electric current.
- 4) Aluminum has a density of 2.698 g/cm^3 at STP.

16. Base your answers to the following questions on the diagram of a molecule of nitrogen shown below:



represents one molecule of nitrogen

- a Draw a particle model that shows at least six molecules of nitrogen gas.
b Draw a particle model that shows at least six molecules of liquid nitrogen.

Base your answers to questions 17 through 19 on the information below and on your knowledge of chemistry.

A student prepares two 141-gram mixtures, A and B. Each mixture consists of NH_4Cl , sand, and H_2O at 15°C . Both mixtures are thoroughly stirred and allowed to stand. The mass of each component used to make the mixtures is listed in the data table below.

Mass of the Components in Each Mixture

Component	Mixture A (g)	Mixture B (g)
NH_4Cl	40.	10.
sand	1	31
H_2O	100.	100.

17. Describe *one* property of sand that would enable the student to separate the sand from the other components in mixture B.
18. Which type of mixture is mixture B?
19. State evidence from the table indicating that the proportion of the components in a mixture can vary.
20. Base your answer to the following question on the information below.

In a laboratory, a student makes a solution by completely dissolving 80.0 grams of $\text{KNO}_3(\text{s})$ in 100.0 grams of hot water. The resulting solution has a temperature of $60.^\circ\text{C}$. The room temperature in the laboratory is 22°C .

Describe a laboratory procedure that can be used to recover the solid solute from the aqueous solution.

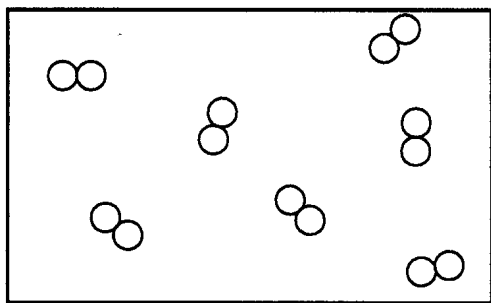
Answer Key
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1. 1
 2. 1
 3. 3
 4. 2
 5. 1
 6. 3
 7. 2
 8. 2
 9. 2
 10. 3
 11. 3
 12. 1
 13. 4
 14. 1
 15. 2
 16. (essay)
 17. —Sand is insoluble in water. —Sand particles are too large to pass through filter paper. —Sand is more dense than $\text{NH}_4\text{Cl}(\text{aq})$. —Sand remains a solid in the mixture.
 18. —het- erogeneous
—nonuniform mixture
 19. —The ratio by mass of NH_4Cl to H_2O in mixture *A* is 40. g/100. g, and the ratio in mixture *B* is 10. g/100. g. —Both mixtures have the same total mass, but have different amounts of sand. —Mixture *B* has more sand. —The mixtures have different proportions of NH_4Cl .
 20. Gently heat the solution to evaporate the water until only solid KNO_3 remains.
or Boil off the water.
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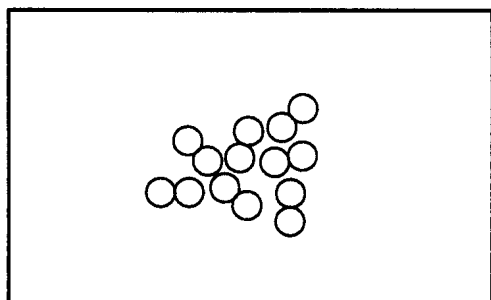
Answer Key
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16.

a



b



c Acceptable responses include, but are not limited to, these examples:

– The particles in nitrogen gas are farther away from each other than the particles in the liquid nitrogen. *or*
– spacing of particles *or* – Gas particles have greater entropy (randomness) than the particles in the liquid.

d – Two dimensional models do not show geometric relationships. *or* – not 3-D *or* – Real particles are three-dimensional. *or* – The model does not show momentary dipoles.
