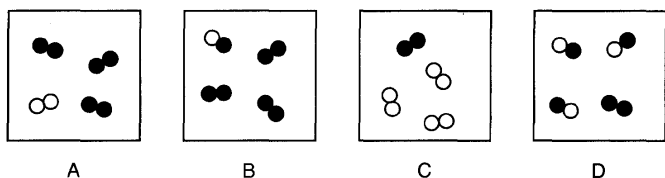
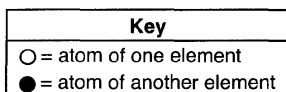


1. Which sample of CO_2 has a definite shape and a definite volume?

- (A) $\text{CO}_2(\text{aq})$ (B) $\text{CO}_2(\text{g})$
 (C) $\text{CO}_2(\ell)$ (D) $\text{CO}_2(\text{s})$

2. Which two particle diagrams represent mixtures of diatomic elements?



- (A) A and B (B) A and C
 (C) B and C (D) B and D

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

- (A) CO (B) Ce (C) Ca (D) Cu

4. Which grouping of the three phases of bromine is listed in order from left to right for increasing distance between bromine molecules?

- (A) gas, liquid, solid (B) liquid, solid, gas
 (C) solid, gas, liquid (D) solid, liquid, gas

5. Which 5.0-milliliter sample of NH_3 will take the shape of and completely fill a closed 100.0-milliliter container?

- (A) $\text{NH}_3(\text{s})$ (B) $\text{NH}_3(\ell)$
 (C) $\text{NH}_3(\text{g})$ (D) $\text{NH}_3(\text{aq})$

6. Which formula represents a mixture?

- (A) $\text{C}_6\text{H}_{12}\text{O}_6(\ell)$ (B) $\text{C}_6\text{H}_{12}\text{O}_6(\text{s})$
 (C) $\text{LiCl}(\text{aq})$ (D) $\text{LiCl}(\text{s})$

7. A mixture of crystals of salt and sugar is added to water and stirred until all solids have dissolved. Which statement best describes the resulting mixture?

- (A) The mixture is homogeneous and can be separated by filtration.
 (B) **The mixture is homogeneous and cannot be separated by filtration.**
 (C) The mixture is heterogeneous and can be separated by filtration.
 (D) The mixture is heterogeneous and cannot be separated by filtration.

8. A sample is prepared by completely dissolving 10.0 grams of NaCl in 1.0 liter of H_2O . Which classification best describes this sample?

- (A) homogeneous compound
 (B) **homogeneous mixture**
 (C) heterogeneous compound
 (D) heterogeneous mixture

9. An aqueous solution of sodium chloride is best classified as a

- (A) homogeneous compound
- (B) homogeneous mixture
- (C) heterogeneous compound
- (D) heterogeneous mixture

10. When a mixture of water, sand, and salt is filtered, what passes through the filter paper?

- (A) water, only
- (B) water and sand, only
- (C) water and salt, only
- (D) water, sand, and salt

11. Petroleum can be separated by distillation because the hydrocarbons in petroleum are

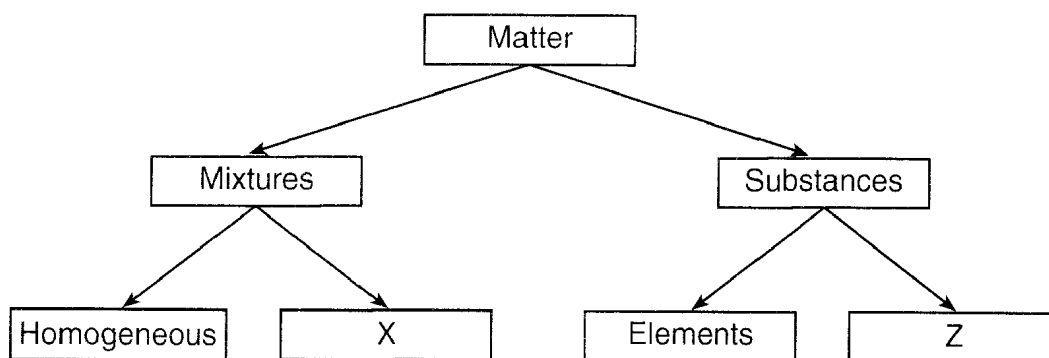
- (A) elements with identical boiling points
- (B) elements with different boiling points
- (C) compounds with identical boiling points
- (D) compounds with different boiling point

12. Which sample of matter can be separated into different substances by physical means?

- (A) $\text{LiCl}(\text{aq})$
 - (B) $\text{LiCl}(\text{s})$
 - (C) $\text{NH}_3(\text{g})$
 - (D) $\text{NH}_3(\ell)$
-

Base your answers to questions 13 through 15 on the diagram below concerning the classification of matter.

Classification of Matter



13. Given a mixture of sand and water, state *one* process that can be used to separate water from the sand.

14. Explain, in terms of particle arrangement, why NaCl(aq) is a homogeneous mixture.

15. What type of mixture is represented by *X*?

16. Object *A* at 40°C and object *B* at 80°C are placed in contact with each other. Which statement describes the heat flow between the objects?

- (A) Heat flows from object *A* to object *B*.
 - (B) Heat flows from object *B* to object *A*.**
 - (C) Heat flows in both directions between the objects.
 - (D) No heat flow occurs between the objects.
-

24. Given the balanced equation:



As a sample of $\text{I}_2(\text{s})$ sublimes to $\text{I}_2(\text{g})$, the entropy of the sample

- (A) increases because the particles are less randomly arranged
- (B) increases because the particles are more randomly arranged**
- (C) decreases because the particles are less randomly arranged
- (D) decreases because the particles are more randomly arranged

25. Which 10-milliliter sample of water has the greatest degree of disorder?

- (A) $\text{H}_2\text{O}(\text{g})$ at 120°C**
- (B) $\text{H}_2\text{O}(\ell)$ at 80°C
- (C) $\text{H}_2\text{O}(\ell)$ at 20°C
- (D) $\text{H}_2\text{O}(\text{s})$ at 0°C

26. A sample of chlorine gas is at 300. K and 1.00 atmosphere. At which temperature and pressure would the sample behave more like an ideal gas?

- (A) 0 K and 1.00 atm
- (B) 150. K and 0.50 atm
- (C) 273 K and 1.00 atm
- (D) 600. K and 0.50 atm**

27. Which statement describes the particles of an ideal gas based on the kinetic molecular theory?

- (A) The gas particles are relatively far apart and have negligible volume.**
- (B) The gas particles are in constant, nonlinear motion.
- (C) The gas particles have attractive forces between them.
- (D) The gas particles have collisions without transferring energy.

28. A 220.0-mL sample of helium gas is in a cylinder with a movable piston at 105 kPa and 275 K. The piston is pushed in until the sample has a volume of 95.0 mL. The new temperature of the gas is 310. K. What is the new pressure of the sample?

- (A) 51.1 kPa
- (B) 216 kPa
- (C) 243 kPa
- (D) 274 kPa**

29. Which set of values represents standard pressure and standard temperature?

- (A) 1 atm and 101.3 K
- (B) 1 kPa and 273 K
- (C) 101.3 kPa and 0°C**
- (D) 101.3 atm and 273°C

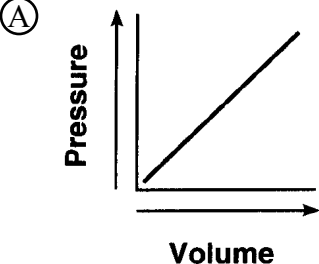
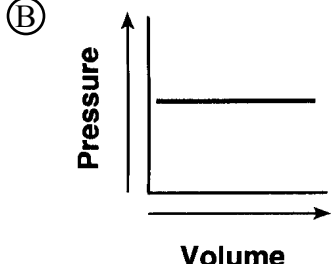
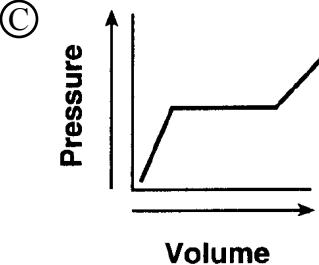
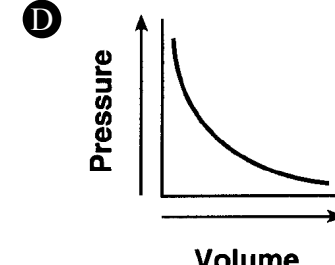
30. Which temperature change would cause a sample of an ideal gas to double in volume while the pressure is held constant?

- (A) from 400. K to 200. K
- (B) from 200. K to 400. K**
- (C) from 400.°C to 200.°C
- (D) from 200.°C to 400.°C

31. At 25°C, gas in a rigid cylinder with a movable piston has a volume of 145 mL and a pressure of 125 kPa. Then the gas is compressed to a volume of 80. mL. What is the new pressure of the gas if the temperature is held at 25°C?

- (A) 69 kPa
- (B) 93 kPa
- (C) 160 kPa
- (D) 230 kPa**

32. Which graph represents the relationship between pressure and volume for a sample of an ideal gas at constant temperature?

- (A) 
- (B) 
- (C) 
- (D) **

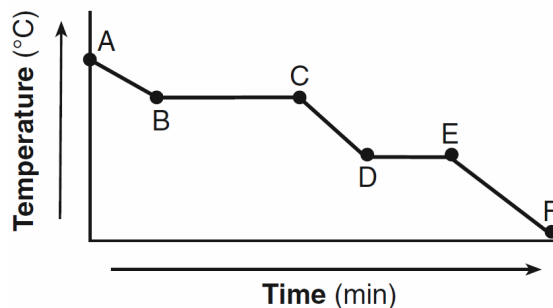
33. At which temperature is the vapor pressure of ethanol equal to the vapor pressure of propanone at 35°C?

- (A) 35°C
- (B) 60.°C**
- (C) 82°C
- (D) 95°C

34. Which changes in pressure and temperature occur as a given mass of gas at 50.6 kPa and 546 K is changed to STP?

- (A) The pressure is doubled and the temperature is halved.**
- (B) The pressure is halved and the temperature is doubled.
- (C) Both the pressure and the temperature are doubled.
- (D) Both the pressure and the temperature are halved.

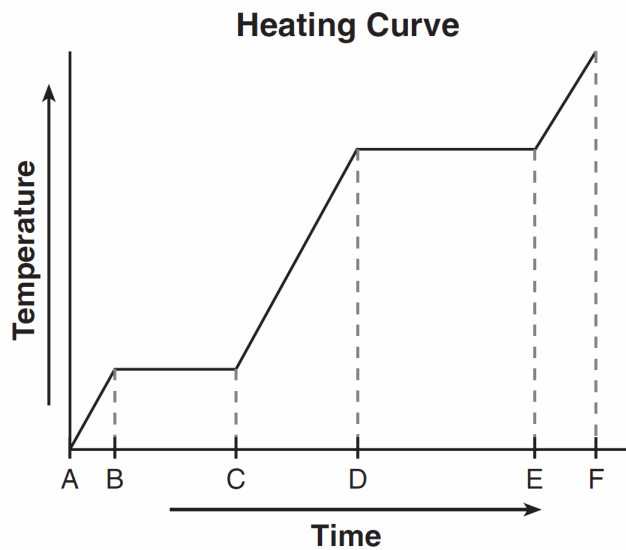
35. Given the cooling curve of a substance:



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

- (A) AB and BC
- (B) AB and CD
- (C) DE and BC**
- (D) DE and EF

36. Given the diagram representing a heating curve for a substance:



During which time interval is the average kinetic energy of the particles of the substance constant while the potential energy of the particles increases?

- (A) *AC* (B) *BC* (C) *CD* (D) *DF*

37. The table below shows the data collected by a student as heat was applied at a constant rate to a solid below its freezing point.

Time (min)	Temperature (°C)	Time (min)	Temperature (°C)
0	20	18	44
2	24	20	47
4	28	22	51
6	32	24	54
8	32	26	54
10	32	28	54
12	35	30	54
14	38	32	58
16	41	34	62

What is the boiling point of this substance?

- (A) 32°C (B) 54°C (C) 62°C (D) 100°C
-
38. The temperature of a sample of water changes from 10.°C to 20.°C when the water absorbs 420 Joules of heat. What is the mass of the sample?
- (A) 1.0 g (B) 10. g
(C) 100 g (D) 1000 g
39. How many Joules of heat energy are released when 50. grams of water are cooled from 70.°C to 60.°C?
- (A) 42 J (B) 210 J
(C) 2100 J (D) 4200 J
40. What is the minimum amount of heat required to completely melt 20.0 grams of ice at its melting point?
- (A) 20.0 J (B) 83.6 J
(C) 6,680 J (D) 45,200 J
41. What is the total number of joules released when a 5.00-gram sample of water changes from liquid to solid at 0°C?
- (A) 334 J (B) 1670 J
(C) 2260 J (D) 11 300 J

42. How much heat energy must be absorbed to completely melt 35.0 grams of $\text{H}_2\text{O}(\text{s})$ at 0°C ?

- (A) 9.54 J (B) 146 J
 (C) 11 700 J (D) 79 100 J

43. At 65°C , which compound has a vapor pressure of 58 kilopascals?

- (A) ethanoic acid (B) ethanol
 (C) propanone (D) water

44. According to Reference Table *H*, what is the boiling point of ethanoic acid at 80 kPa?

- (A) 28°C (B) 100°C
 (C) 111°C (D) 125°C

45. At 1 atmosphere of pressure, 25.0 grams of a compound at its normal boiling point is converted to a gas by the addition of 34,400 Joules. What is the heat of vaporization for this compound, in Joules per gram?

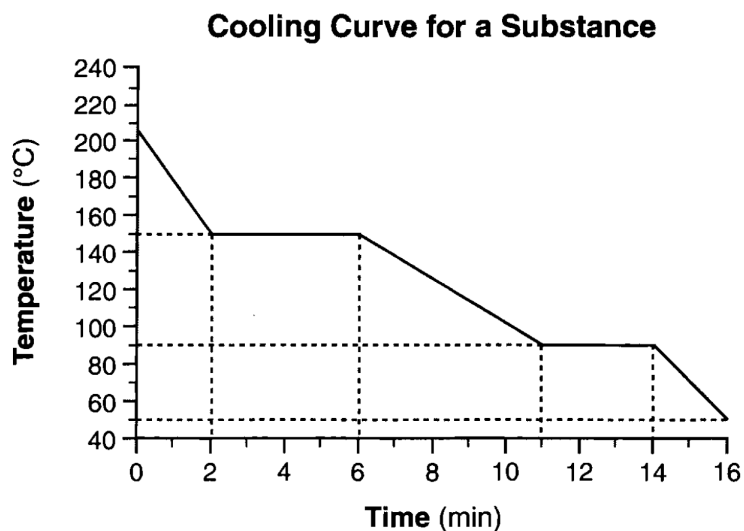
- (A) 25.0 J/g (B) 1376 J/g
 (C) 2,260 J/g (D) 34,400 J/g

46. What is the normal boiling point of ethanoic acid?

- (A) 52°C (B) 55°C
 (C) 101.3°C (D) 117.9°C
-

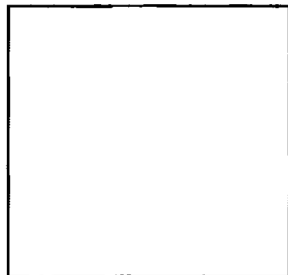
Base your answers to questions 47 through 49 on the information below.

Starting as a gas at 206°C, a sample of a substance is allowed to cool for 16 minutes. This process is represented by the cooling curve below.

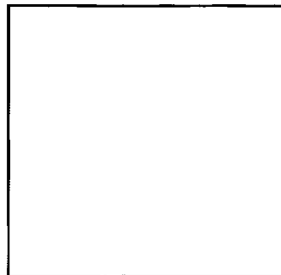


47. Using the key below, draw *two* particle diagrams to represent the *two* phases of the sample at minute 4. Your response must include *at least six* particles for *each* diagram.

Key
○ = particle of the substance



One phase of the sample at minute 4

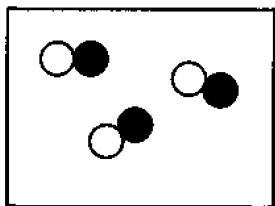


A different phase of the sample at minute 4

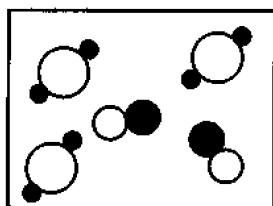
48. At what time do the particles of this sample have the *lowest* average kinetic energy?

49. What is the melting point of this substance?

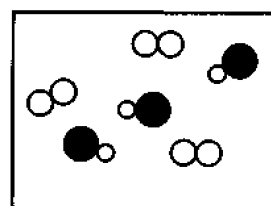
50. Base your answer to the following question on the pictures below:



A



B

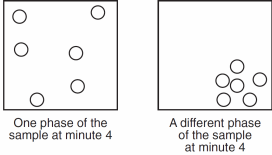


C

Contrast sample *A* and sample *B*, in terms of *compounds* and *mixtures*. Include both sample *A* and sample *B* in your answer.

Answer Key

Unit 2 Matter Review Questions.2014

- | | |
|--|---|
| <p>1. D</p> <p>2. B</p> <p>3. A</p> <p>4. D</p> <p>5. C</p> <p>6. C</p> <p>7. B</p> <p>8. B</p> <p>9. B</p> <p>10. C</p> <p>11. D</p> <p>12. A</p> <p>13. Examples: –
Evaporate the water. –
Decant the water.
-filtration</p> <p>14. Examples: – The
water molecules,
sodium ions, and
chloride ions are
uniformly mixed
together.
– All particles
distribute evenly.</p> <p>15. Examples: –
heterogeneous –
nonuniform</p> <p>16. B</p> <p>17. C</p> <p>18. D</p> <p>19. C</p> <p>20. B</p> <p>21. C</p> <p>22. A</p> <p>23. B</p> <p>24. B</p> <p>25. A</p> <p>26. D</p> <p>27. A</p> | <p>28. D</p> <p>29. C</p> <p>30. B</p> <p>31. D</p> <p>32. D</p> <p>33. B</p> <p>34. A</p> <p>35. C</p> <p>36. B</p> <p>37. B</p> <p>38. B</p> <p>39. C</p> <p>40. C</p> <p>41. B</p> <p>42. C</p> <p>43. B</p> <p>44. C</p> <p>45. B</p> <p>46. D</p> <p>47. </p> <p>48. minute 16 or at 16
minutes</p> <p>49. $90^{\circ}\text{C} \pm 2^{\circ}\text{C}$</p> <p>50. Particles in sample <i>A</i>
show molecules of a
compound whereas
particles in sample <i>B</i>
show two compounds
as a mixture <i>or A</i> –
compound, <i>B</i> –
mixture <i>or A</i> – 1
compound, <i>B</i> – 2
compounds</p> |
|--|---|