

## Pre-AP Chemistry

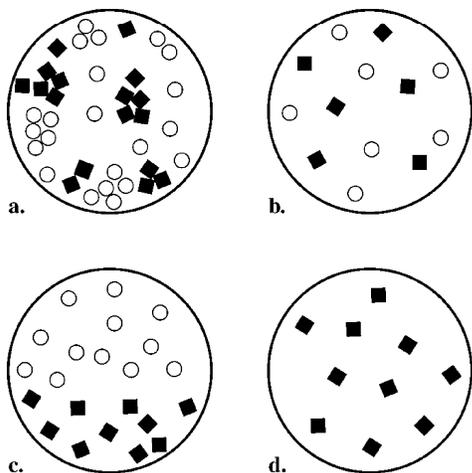
## Midterm Review 2016

## Part 1

**Multiple Choice**

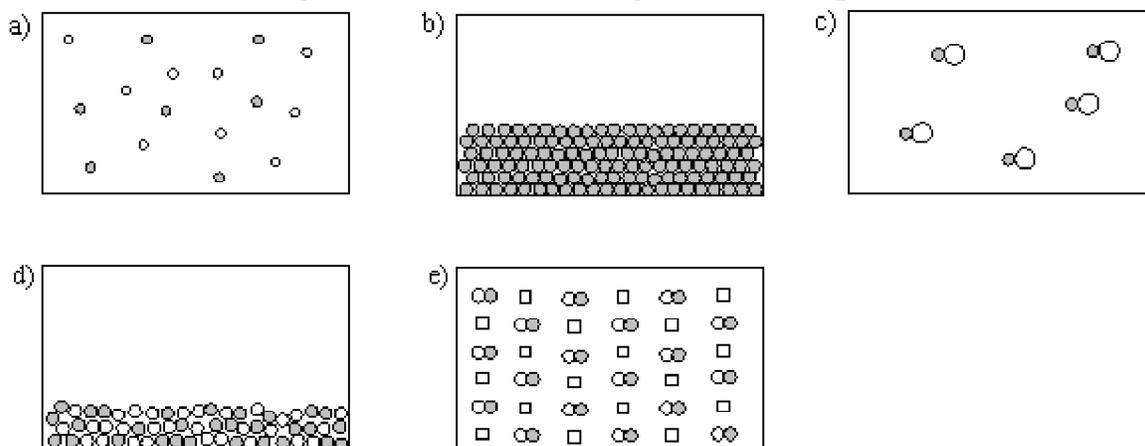
Identify the choice that best completes the statement or answers the question.

- \_\_\_\_\_ 1. How many significant figures are in 6,051.00?  
a. 5                      b. 3                      c. 4                      d. 6
- \_\_\_\_\_ 2. Which of the following is a physical change?  
a. corrosion              b. food spoilage              c. explosion              d. evaporation
- \_\_\_\_\_ 3. A metal solution is a(n)  
a. alloy.                      b. electrolyte.              c. colloid.              d. suspension.
- \_\_\_\_\_ 4. Which of the following CANNOT be classified as a substance?  
a. air                      b. nitrogen              c. table salt              d. gold
- \_\_\_\_\_ 5. A chemical change occurs when a piece of wood \_\_\_\_\_.  
a. is painted              b. is split              c. is cut              d. decays or rots
- \_\_\_\_\_ 6. What causes the high density of solids?  
a. The particles are more massive than those in liquids.  
b. The particles are packed closely together.  
c. The intermolecular forces between particles are weak.  
d. The energy of the particles is very high.
- \_\_\_\_\_ 7. The compressibility of a liquid is generally  
a. infinite.                      c. more than that of a gas.  
b. equal to that of a gas.              d. less than that of a gas.
- \_\_\_\_\_ 8. What units is mass measured in using the metric system?  
a. grams                      b. liters                      c. meters                      d. pounds
- \_\_\_\_\_ 9. All of the following changes to a metal are physical changes EXCEPT \_\_\_\_\_.  
a. polishing                      c. rusting                      e. melting  
b. cutting                      d. bending
- \_\_\_\_\_ 10. Which of the following does NOT involve a physical change?  
a. mixing                      b. melting                      c. grinding                      d. tarnishing



11. Which part of the illustration above shows the particles in a heterogeneous mixture?  
 a. a                      b. b                      c. c                      d. d

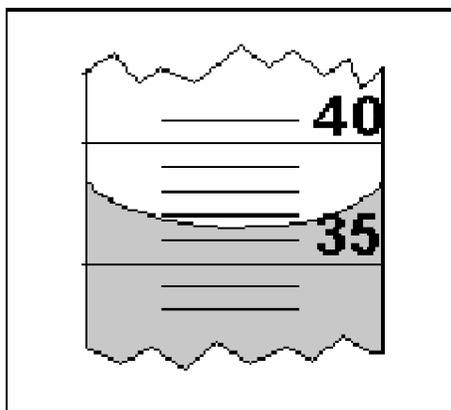
Consider the following choices when answering the next two questions.



12. Which best represents a heterogeneous mixture of two elements?  
 a. option a      b. option b      c. option c      d. option d      e. option e
13. Which best represents a gaseous compound?  
 a. option a      b. option b      c. option c      d. option d      e. option e
14. The energy level of the particles in a solid is  
 a. high enough to allow the particles to interchange with other particles.  
 b. higher than the energy of the particles in a gas.  
 c. lower than the energy of the particles in liquids and gases.  
 d. higher than the energy of the particles in a liquid.
15. Which state of matter has a definite volume and takes the shape of its container?  
 a. liquid                      c. gas  
 b. both a liquid and a gas      d. solid

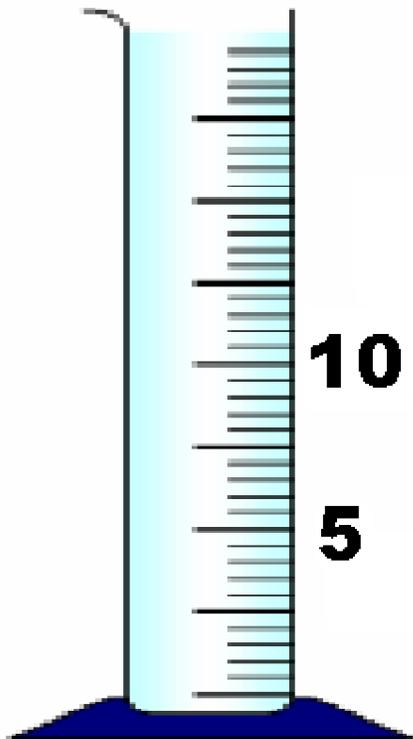
- \_\_\_\_\_ 16. One difference between a mixture and a compound is that \_\_\_\_\_.
- a mixture can only be separated into its components by chemical means.
  - a mixture must be uniform in composition.
  - a compound can only be separated into its components by chemical means.
  - a compound is made up of more than one phase.
- \_\_\_\_\_ 17. Which of the following is a chemical property?
- freezing point
  - color
  - density
  - reactivity with oxygen
- \_\_\_\_\_ 18. Which of the following is a homogeneous mixture?
- soil
  - beef stew
  - salt water
  - raisin bread
  - sand and water
- \_\_\_\_\_ 19. \_\_\_\_\_ are substances with constant composition that can be broken down into elements by chemical processes.
- Quarks
  - Compounds
  - Heterogeneous mixtures
  - Solutions
  - Mixtures
- \_\_\_\_\_ 20. Which of the following is a true statement about homogeneous mixtures?
- They have compositions that never vary.
  - They are known as solutions.
  - They consist of two or more phases.
  - They can consist only of liquids.
- \_\_\_\_\_ 21. Which of the following is NOT a pure substance?
- mercury
  - liquid helium
  - apple juice
  - liquid oxygen
- \_\_\_\_\_ 22. A vapor is which state of matter?
- gas
  - plasma
  - liquid
  - solid
- \_\_\_\_\_ 23. The diameter of a carbon atom is 0.000 000 000 154 m. What is this number expressed in scientific notation?
- $1.54 \times 10^{-10}$  m
  - $1.54 \times 10^{12}$  m
  - $1.54 \times 10^{-12}$  m
  - $1.54 \times 10^{10}$  m
- \_\_\_\_\_ 24. Express the product of  $4.0 \times 10^{-2}$  m and  $8.1 \times 10^2$  m using the correct number of significant digits.
- $3.2 \times 10^1$
  - $3.3 \times 10^1$
  - $3 \times 10^1$
  - $3.0 \times 10^1$
  - $3.24 \times 10^1$
- \_\_\_\_\_ 25. If the accepted value is 112g and the experimental value is 107.3g, what is the percent error?
- 4.196
  - 4.20
  - .042
  - .958

- \_\_\_\_ 26. Three different people weigh a standard mass of 2.00 g on the same balance. Each person obtains a reading of 7.32 g for the mass of the standard. These results imply that the balance that was used is \_\_\_\_\_.
- a. neither accurate nor precise                      c. accurate and precise  
b. precise    d. accurate
- \_\_\_\_ 27. Express the product of 2.2 mm and 5.00 mm using the correct number of significant digits.
- a. 11.00 mm<sup>2</sup>    d. 11 mm<sup>2</sup>  
b. 11.0 mm<sup>2</sup>    e. none of the above  
c. 10 mm<sup>2</sup>
- \_\_\_\_ 28. What is 5928 km expressed in scientific notation?
- a. 5.928 ? 10<sup>0</sup>    c. 5.928 ? 10<sup>2</sup>  
b. 5.928 ? 10<sup>-3</sup>    d. 5.928 ? 10<sup>3</sup>
- \_\_\_\_ 29. How many significant figures are there in the measurement 40 500 mg?
- a. five    d. This cannot be determined.  
b. two    e. four  
c. three

**Figure 1**

- \_\_\_\_ 30. What is the volume of the liquid represented in figure 1?
- a. 36.5    c. 35.5  
b. 36    d. 35.3
- \_\_\_\_ 31. When applied to scientific measurements, the words *accuracy and precision*
- a. have limitations.    c. are used interchangeably.  
b. can cause uncertainty in experiments.              d. have distinctly different meanings.
- \_\_\_\_ 32. What is the measurement 1042 L rounded off to two significant digits?
- a. 1050 L    d. 1.0 x 10<sup>3</sup>L  
b. 1040 L    e. none of the above  
c. 1.1 x 10<sup>3</sup> L

- \_\_\_ 33. What is the result of adding  $(2.5 \times 10^3) + (3.5 \times 10^2)$ ?
- a.  $2.85 \times 10^3$                       c.  $6.0 \times 10^5$   
b.  $2.85 \times 10^2$                       d.  $6.0 \times 10^3$



**Figure 2**

- \_\_\_ 34. What increment does each gradation on the graduated cylinder in Figure 2 measure?
- a. .1 ml                                      c. .5 ml  
b. 5 ml                                        d. .2 ml
- \_\_\_ 35. What is the result of multiplying  $(2.5 \times 10^{10}) \times (3.5 \times 10^{-7})$ ?
- a.  $8.75 \times 10^{-3}$                       c.  $8.75 \times 10^{-17}$   
b.  $8.75 \times 10^3$                         d.  $8.75 \times 10^{17}$
- \_\_\_ 36. How many significant figures are there in the measurement 0.003 4 kg?
- a. This cannot be determined.                      d. three  
b. five    e. two  
c. four
- \_\_\_ 37. Express the sum of 7.68 m and 5.0 m using the correct number of significant digits.
- a. 12.7                                        d. 10 m  
b. 13    e. none of the above  
c. 12.68

- \_\_\_ 38. What is the measurement 111.009 mm rounded off to four significant digits?
- a. 111.0 mm
  - b. 100 mm
  - c. 111.01 mm
  - d. 110 mm
  - e. 111 mm
- \_\_\_ 39. In the measurement 0.503 L, which digit is the estimated digit?
- a. 5
  - b. There is no estimated digit in this measurement.
  - c. the 0 immediately to the left of the 3
  - d. 3
  - e. the 0 to the left of the decimal point
- \_\_\_ 40. How many significant figures are there in the conversion factor 100 cm/1 m?
- a. three
  - b. two
  - c. one
  - d. four
  - e. an unlimited number
- \_\_\_ 41. The closeness of a measurement to its true value is a measure of its \_\_\_\_.
- a. precision
  - b. accuracy
  - c. reproducibility
  - d. usefulness
- \_\_\_ 42. Which group of measurements is the most precise? (Each group of measurements is for a different object.)
- a. 2 g, 3 g, 4 g
  - b. 1 g, 3 g, 5 g
  - c. 2.0 g, 3.0 g, 4.0 g
  - d. 2 g, 2.5 g, 3 g
  - e. 2.0 g, 3.0 g, 4.0 g, 5.0 g
- \_\_\_ 43. The symbol mm represents
- a. micrometer.
  - b. millimeter.
  - c. milliliter.
  - d. meter.
- \_\_\_ 44. The symbol for the metric unit used to measure mass is
- a. m.
  - b. mm.
  - c. g.
  - d. L.
- \_\_\_ 45. The unit  $m^3$  measures
- a. length.
  - b. mass.
  - c. volume.
  - d. density.
- \_\_\_ 46. A volume of 1 cubic centimeter is equivalent to
- a. 1 milliliter.
  - b. 1 gram.
  - c. 1 liter.
  - d.  $10^{-1}$  cubic decimeters.
- \_\_\_ 47. A measure of Earth's gravitational pull on matter is
- a. density.
  - b. weight.
  - c. volume.
  - d. mass.
- \_\_\_ 48. The relationship between the mass  $m$  of a material, its volume  $V$ , and its density  $D$  is
- a.  $V = mD$ .
  - b.  $Vm = D$ .
  - c.  $DV = m$ .
  - d.  $D + V = m$ .

- \_\_\_ 49. The density of aluminum is  $2.70 \text{ g/cm}^3$ . The volume of a solid piece of aluminum is  $1.50 \text{ cm}^3$ . Find its mass.
- 1.50 g
  - 1.80 g
  - 2.70 g
  - 4.05 g
- \_\_\_ 50. The mass of a  $5.00 \text{ cm}^3$  sample of gold is 96.5 g. The density of gold is
- $0.0518 \text{ g/cm}^3$ .
  - $19.3 \text{ g/cm}^3$ .
  - $101.5 \text{ g/cm}^3$ .
  - $483 \text{ g/cm}^3$ .
- \_\_\_ 51. 0.05 cm is the same as
- 0.000 05 m.
  - 0.005 mm.
  - 0.05 m.
  - 0.5 mm.
- \_\_\_ 52. The number of grams equal to 0.5 kg is
- 0.0005.
  - 0.005.
  - 500.
  - 5000.

**Mass Data of Sample**

|                  | <b>Trial 1</b> | <b>Trial 2</b> | <b>Trial 3</b> | <b>Trial 4</b> |
|------------------|----------------|----------------|----------------|----------------|
| <b>Student A</b> | 1.43 g         | 1.52 g         | 1.47 g         | 1.42 g         |
| <b>Student B</b> | 1.43 g         | 1.40 g         | 1.46 g         | 1.44 g         |
| <b>Student C</b> | 1.54 g         | 1.56 g         | 1.58 g         | 1.50 g         |
| <b>Student D</b> | 0.86 g         | 1.24 g         | 1.52 g         | 1.42 g         |

- \_\_\_ 53. Four students each measured the mass of one 1.43 g sample four times. The results in the table above indicate that the data collected by \_\_\_ reflect the greatest accuracy and precision.
- Student A
  - Student B
  - Student C
  - Student D
- \_\_\_ 54. The dimensions of a rectangular solid are measured to be 1.27 cm, 1.3 cm, and 2.5 cm. The volume should be recorded as
- $4.128 \text{ cm}^3$ .
  - $4.12 \text{ cm}^3$ .
  - $4.13 \text{ cm}^3$ .
  - $4.1 \text{ cm}^3$ .
- \_\_\_ 55. Which prefixes are in the correct order from smallest to largest?
- milli, deci, centi, mega
  - pico, nano, centi, milli
  - micro, nano, milli, centi
  - milli, deci, kilo, giga
- \_\_\_ 56. Which of the following statements is true?
- Atoms may be divided in ordinary chemical reactions.
  - Matter is composed of large particles called atoms.
  - Atoms can never combine with any other atoms.
  - Atoms of the same element may have different masses.
- \_\_\_ 57. The sum of the protons and neutrons in an atom equals the \_\_\_\_.
- atomic mass
  - atomic number
  - nucleus number
  - mass number

- \_\_\_\_\_ 58. Which of the following is NOT part of Dalton's atomic theory?
- All matter is composed of extremely small particles called atoms.
  - Atoms cannot be divided, created, or destroyed.
  - The number of protons in an atom is its atomic number.
  - In chemical reactions, atoms are combined, separated, or rearranged.
- \_\_\_\_\_ 59. The atomic number of oxygen, 8, indicates that there are eight
- protons in the nucleus of an oxygen atom.
  - neutrons outside the oxygen atom's nucleus.
  - energy levels in the oxygen atom's nucleus.
  - oxygen nuclides.
- \_\_\_\_\_ 60. As the atomic number increases, the number of electrons in an atom
- remains the same.
  - is undetermined.
  - decreases.
  - increases.

17 2-

**O**

8

**Figure 1**

- \_\_\_\_\_ 61. How many neutrons does the atom in Figure 1 contain?
- 9
  - 8
  - 17
  - 2
- \_\_\_\_\_ 62. Neon-22 contains 12 neutrons. It also contains
- 12 protons.
  - 22 electrons.
  - 10 protons.
  - 22 protons.

|                                      |                                     |                                       |                                       |                                      |   |   |                                      |  |                                       |                                      |  |                                       |  |                                      |                                    |
|--------------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|---|---|--------------------------------------|--|---------------------------------------|--------------------------------------|--|---------------------------------------|--|--------------------------------------|------------------------------------|
| 1<br><b>H</b><br>Hydrogen<br>1.01    |                                     |                                       |                                       |                                      |   |   |                                      |  |                                       |                                      | Group 18<br>2<br><b>He</b><br>Helium<br>4.00 |                                       |  |                                      |                                    |
| Group 1                              |                                     | Group 2                               |                                       | Group 13                             |   | Group 14                                |                                      | Group 15                               |                                       | Group 16                             |  | Group 17                              |  |                                      |                                    |
| 3<br><b>Li</b><br>Lithium<br>6.94    | 4<br><b>Be</b><br>Beryllium<br>9.01 | 5<br><b>B</b><br>Boron<br>10.81       | 6<br><b>C</b><br>Carbon<br>12.01      | 7<br><b>N</b><br>Nitrogen<br>14.01   | 8<br><b>O</b><br>Oxygen<br>16.00        | 9<br><b>F</b><br>Fluorine<br>19.00      | 10<br><b>Ne</b><br>Neon<br>20.18     | 11<br><b>Na</b><br>Sodium<br>22.99     | 12<br><b>Mg</b><br>Magnesium<br>24.30 | 13<br><b>Al</b><br>Aluminum<br>26.98 | 14<br><b>Si</b><br>Silicon<br>28.08          | 15<br><b>P</b><br>Phosphorus<br>30.97 | 16<br><b>S</b><br>Sulfur<br>32.07      | 17<br><b>Cl</b><br>Chlorine<br>35.45 | 18<br><b>Ar</b><br>Argon<br>39.95  |
| 19<br><b>K</b><br>Potassium<br>39.10 | 20<br><b>Ca</b><br>Calcium<br>40.08 | 31<br><b>Ga</b><br>Gallium<br>69.72   | 32<br><b>Ge</b><br>Germanium<br>72.61 | 33<br><b>As</b><br>Arsenic<br>74.92  | 34<br><b>Se</b><br>Selenium<br>78.96    | 35<br><b>Br</b><br>Bromine<br>79.90     | 36<br><b>Kr</b><br>Krypton<br>83.80  | 37<br><b>Rb</b><br>Rubidium<br>85.47   | 38<br><b>Sr</b><br>Strontium<br>87.62 | 49<br><b>In</b><br>Indium<br>114.82  | 50<br><b>Sn</b><br>Tin<br>118.71             | 51<br><b>Sb</b><br>Antimony<br>121.76 | 52<br><b>Te</b><br>Tellurium<br>127.60 | 53<br><b>I</b><br>Iodine<br>126.90   | 54<br><b>Xe</b><br>Xenon<br>131.29 |
| 55<br><b>Cs</b><br>Cesium<br>132.90  | 56<br><b>Ba</b><br>Barium<br>137.33 | 81<br><b>Tl</b><br>Thallium<br>204.38 | 82<br><b>Pb</b><br>Lead<br>207.2      | 83<br><b>Bi</b><br>Bismuth<br>208.98 | 84<br><b>Po</b><br>Polonium<br>(208.98) | 85<br><b>At</b><br>Astatine<br>(209.99) | 86<br><b>Rn</b><br>Radon<br>(222.02) | 7<br><b>Fr</b><br>Francium<br>(223.02) | 88<br><b>Ra</b><br>Radium<br>(226.02) |                                      |  |                                       |  |                                      |                                    |

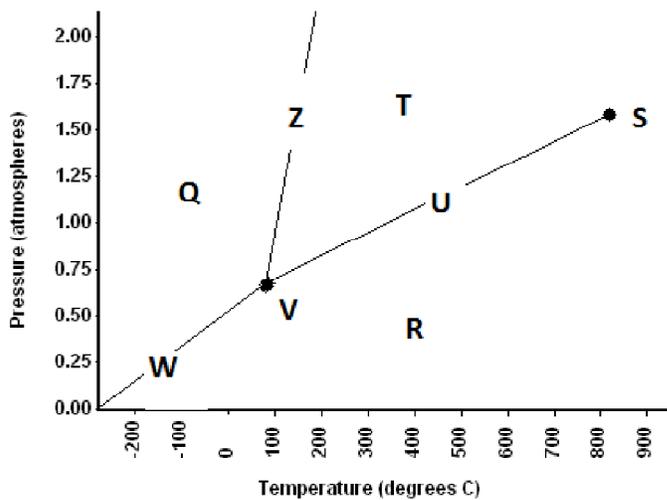
- \_\_\_\_\_ 63. What is the atomic number for aluminum from the figure above?
- a. 13  
b. 26.98  
c. 26.9815  
d. 14
- \_\_\_\_\_ 64. In the figure above, a neutral atom of silicon contains
- a. 14 electrons.  
b. 16 electrons.  
c. 38 electrons.  
d. 28.09 electrons.
- \_\_\_\_\_ 65. The mass of a neutron is
- a. double that of a proton.  
b. about the same as that of a proton.  
c. double that of an electron.  
d. about the same as that of an electron.
- \_\_\_\_\_ 66. Atoms of the same element with different numbers of neutrons are called \_\_\_\_\_.
- a. metals  
b. isotopes  
c. radioactive elements  
d. metalloids
- \_\_\_\_\_ 67. Aluminum is in what period?
- a. 13.  
b. 3.  
c. 6.  
d. 2.



- \_\_\_\_\_ 76. Atoms of the same element can differ in
- a. number of protons and electrons.
  - b. mass number.
  - c. chemical properties.
  - d. atomic number.
- \_\_\_\_\_ 77. The idea of arranging the elements in the periodic table according to their chemical and physical properties is attributed to
- a. Bohr.
  - b. Moseley.
  - c. Mendeleev.
  - d. Ramsay.
- \_\_\_\_\_ 78. A horizontal row of blocks in the periodic table is called a(n)
- a. period.
  - b. octet.
  - c. group.
  - d. family.
- \_\_\_\_\_ 79. The nucleus of most atoms is composed of
- a. tightly packed protons and neutrons.
  - b. tightly packed protons.
  - c. loosely connected protons and electrons.
  - d. tightly packed neutrons.
- \_\_\_\_\_ 80. The elements in Groups 3 through 12 of the periodic table are the \_\_\_\_\_.
- a. transition elements
  - b. halogens
  - c. actinides
  - d. alkaline earth metals
- \_\_\_\_\_ 81. Argon, krypton, and xenon are
- a. noble gases.
  - b. actinides.
  - c. alkaline earth metals.
  - d. lanthanides.
- \_\_\_\_\_ 82. A certain atom has 26 protons, 26 electrons, and 30 neutrons. Its mass number is \_\_\_\_\_.
- a. 30
  - b. 52
  - c. 56
  - d. 26
- \_\_\_\_\_ 83. To which group do fluorine and chlorine belong?
- a. halogens
  - b. transition elements
  - c. alkaline-earth metals
  - d. actinides
- \_\_\_\_\_ 84. Which statement is true according to Dalton's theory?
- a. Atoms of the same element differ in electric charge.
  - b. Atoms can be subdivided into smaller particles.
  - c. Atoms of different elements can join to form larger atoms.
  - d. Atoms of the same element are exactly alike.



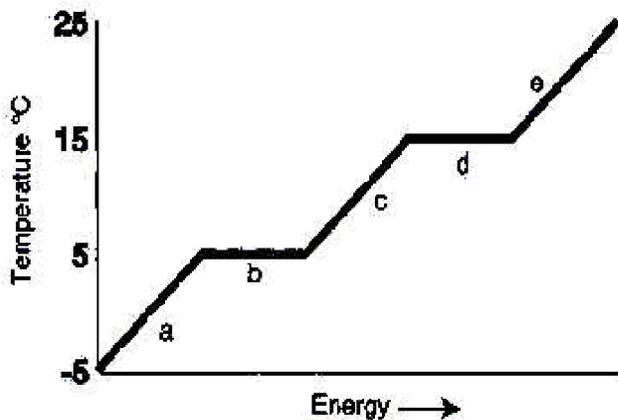
**Matching**



Match the correct graph location to the following terms.

- |      |      |
|------|------|
| a. V | d. S |
| b. Q | e. R |
| c. T |      |

- \_\_\_ 90. Gas
- \_\_\_ 91. Liquid
- \_\_\_ 92. The three phases coexist at this point.
- \_\_\_ 93. Solid
- \_\_\_ 94. Critical point



- |      |      |
|------|------|
| a. a | d. d |
| b. b | e. e |
| c. c |      |

- \_\_\_ 95. Which part of the graph is the liquid phase?
- \_\_\_ 96. Which part of the graph represents melting?

Name: \_\_\_\_\_

ID: A

- \_\_\_\_ 97. Which part of the graph represents freezing?
- \_\_\_\_ 98. Which part of the graph is the solid phase?