

# 1 • Matter and Measurement

---

## PRACTICE TEST

- Which physical state of matter exhibits the greatest change in volume with changes in temperature or pressure?  
a) solid            b) liquid            c) gas
- According to the Kinetic Molecular Theory particles of a solid  
a) are bound in a regular array and do not move.  
b) float freely within an array occupying various positions relative to neighbors.  
c) have no relationship to the microscopic structure of the solid.  
d) vibrate back and forth but do not move past immediate neighbors.  
e) float freely in the inside but do not move on the surface.
- What volume of a liquid having a density of  $1.48 \text{ g/cm}^3$  is needed to supply 5.00 grams of the liquid?  
a)  $0.296 \text{ cm}^3$             d)  $3.38 \text{ cm}^3$   
b)  $1.48 \text{ cm}^3$             e)  $7.40 \text{ cm}^3$   
c)  $2.26 \text{ cm}^3$
- The density of aluminum is  $2.70 \text{ g/cm}^3$ . If a cube of aluminum weighs 13.5 grams, what is the length of the edge of the cube?  
a) 5.00 cm            d) 0.312 cm  
b) 1.71 cm            e) 0.200 cm  
c) 1.25 cm
- Which temperature change is the smallest?  
a)  $10^\circ\text{C}$  to  $20^\circ\text{C}$             d)  $10^\circ\text{F}$  to  $20^\circ\text{C}$   
b) 10 K to  $20^\circ\text{C}$             e)  $10^\circ\text{F}$  to  $20^\circ\text{F}$   
c) 10 K to 20 K
- The number of significant figures in  $0.06060 \times 10^{-5}$  is  
a) 2            d) 5  
b) 3            e) 6  
c) 4
- The number, three hundred and fifty thousand, written in scientific notation is best written as  
a) 350            d)  $3.50 \times 10^5$   
b)  $3.5 \times 10^6$             e)  $3.50 \times 10^{-5}$   
c)  $3.5 \times 10^5$
- The mass of a sample weighted on an electronic balance that is sensitive to  $\pm 0.3 \text{ mg}$  is 1.2300 g. The number of significant figures in this measurement is  
a) 1            d) 4  
b) 2            e) 5  
c) 3
- What is the numerical value of:  
 $1.5 \text{ cm} - 7.222 \times 10^{-1} \text{ cm}$   
a) 0.7778 cm            d) 0.8 cm  
b) 0.778 cm            e)  $7.072 \times 10^{-1} \text{ cm}$   
c) 0.78 cm

10. Four samples were weighed using three different balances. (All are as accurate as the precision below indicates.) The masses are 0.94 kg, 58.2 g, 1.55 g, and 250 mg. This total mass should be reported as
- 1000.000 g
  - 1000.0 g
  - $1.000 \times 10^3$  g
  - $1.00 \times 10^3$  g
  - $1.0 \times 10^3$  g
11. The temperature of the room is 75°F. What is its temperature in Celsius degrees?
- 24°C
  - 27°C
  - 30°C
  - 43°C
  - 43°C
12. The symbols for a metal, a non-metal and a noble gas in that order are
- Ag, Ga, Xe
  - Ce, Ge, Ne
  - Ca, Sn, Ks
  - Ba, P, Ar
  - P, Pb, Kr
13. Which of the following elements is a non-metal?
- Ca
  - Cr
  - Co
  - Cl
  - Cs
14. A good example of an ionic compound is
- water
  - sugar
  - dry ice
  - sodium chloride
  - natural gas
15. When a pure solid substance was heated, a student obtained another solid and a gas, each of which was a pure substance. From this information which of the following statements is ALWAYS a correct conclusion?
- The original solid is not an element.
  - Both products are elements.
  - The original solid is a compound and the gas is an element.
  - The original solid is an element and the gas is a compound.
  - Both products are compounds.
16. Classify each observation as a physical or a chemical property and tally them.
- Observation 1: Bubbles form on a piece of metal when it is dropped into acid.
- Observation 2: The color of a crystalline substance is yellow.
- Observation 3: A shiny metal melts at 650°C.
- Observation 4: The density of a solution is 1.84 g/cm<sup>3</sup>
- 2 chemical properties and 2 physical properties
  - 3 chemical properties and 1 physical properties.
  - 1 chemical properties and 3 physical properties
  - 4 chemical properties
  - 4 physical properties
17. To convert a value in kilograms to centigrams one should
- multiply by  $10^5$
  - multiply by  $10^3$
  - multiply by  $10^{-3}$
  - divide by  $10^5$
  - divide by  $10^{-1}$

18. How many  $\text{cm}^2$  are in an area of  $4.21 \text{ in}^2$ ?
- a)  $10.7 \text{ cm}^2$                       d)  $1.66 \text{ cm}^2$   
 b)  $114 \text{ cm}^2$                         e)  $1.14 \text{ cm}^2$   
 c)  $27.2 \text{ cm}^2$
19. When the prefix micro ( $\mu$ ) is used in the metric system, a fundamental unit of measurement is multiplied by a factor of
- a)  $10^{-9}$                                 d)  $10^3$   
 b)  $10^{-6}$                                 e)  $10^9$   
 c)  $10^{-3}$
20. Of the masses  $86.30 \text{ g}$ ,  $0.0863 \text{ kg}$  and  $8.630 \times 10^5 \text{ mg}$ , which (if any) is the largest?
- a)  $86.30$                                 d) they are the same  
 b)  $0.0863 \text{ kg}$                         e) two are the same,  
 c)  $8.630 \times 10^5 \text{ mg}$                 one is smaller
21. The element chlorine is obtained for commercial use by the following method:
- a) Isolation from gas pockets in the earth's crust.  
 b) Separation from air by a high pressure technique.  
 c) Filtration of brine ( $\text{NaCl}$ ) solutions.  
 d) Electrolysis of aqueous  $\text{NaCl}$  solutions.  
 e) Mixing sulfur and argon in equal quantities.
22. Consider a brass alloy which contains 66% copper and 34% zinc. How many grams of zinc are present in  $125 \text{ kg}$  of the alloy?
- a)  $2.4 \text{ g}$                                 d)  $2.4 \times 10^4 \text{ g}$   
 b)  $42 \text{ g}$                                  e)  $4.2 \times 10^4 \text{ g}$   
 c)  $83 \text{ g}$
23. The density of a sodium sulfate solution is  $1.07 \text{ g/cm}^3$ . The solution is 8.00% sodium sulfate by mass. How many  $\text{cm}^3$  of the solution are needed to supply  $4.28 \text{ g}$  of sodium sulfate?
- a)  $30.0 \text{ cm}^3$                         d)  $45.0 \text{ cm}^3$   
 b)  $35.0 \text{ cm}^3$                         e)  $50.0 \text{ cm}^3$   
 c)  $40.0 \text{ cm}^3$
24. Which of the following is NOT an SI base unit?
- a) mass                                    d) time  
 b) volume                                e) temperature  
 c) length

Answers: (*Please use CAPITAL letters*)

1.	<input type="text"/>	7.	<input type="text"/>	13.	<input type="text"/>	19.	<input type="text"/>
2.	<input type="text"/>	8.	<input type="text"/>	14.	<input type="text"/>	20.	<input type="text"/>
3.	<input type="text"/>	9.	<input type="text"/>	15.	<input type="text"/>	21.	<input type="text"/>
4.	<input type="text"/>	10.	<input type="text"/>	16.	<input type="text"/>	22.	<input type="text"/>
5.	<input type="text"/>	11.	<input type="text"/>	17.	<input type="text"/>	23.	<input type="text"/>
6.	<input type="text"/>	12.	<input type="text"/>	18.	<input type="text"/>	24.	<input type="text"/>