

Fill in the correct answer on the answer sheet.

$$N_A = 6.022 \times 10^{23} \text{ mol}^{-1} \quad T_K/K = t_{\text{c}}/^{\circ}\text{C} + 273.15$$

Be sure you always provide the proper units!

- 1) A scientific law is:
  - A) a very tentative suggestion to generalize or explain observations.
  - B) an explanation for many consistent observations.
  - C) a statement that one puts forth to prove a particular point.
  - D) a phenomenon that is proven.
  - E) a generalization that covers many observations.
- 2) Convert  $5.1 \times 10^{-2} \mu\text{m}$  to cm.
- 3) A) What is the result, to the proper number of significant figures, of the operation: (You may need to use scientific notation to express the proper number of significant figures.)  
 $(0.3877 \times 2145.7) \times 0.29$ .  
B) What is the result, to the proper number of significant figures, of the operation:  
 $0.48 - 0.290 + 29.5$
- 4) Calculate the mass of a piece of metal that has a density of  $8.45 \text{ g mL}^{-1}$  and a volume of 57.2 mL.
- 5) Calculate the volume of a piece of metal that has a mass of 44.7 g and a density of  $10.81 \text{ g mL}^{-1}$ .
- 6) How many neutrons and protons are there in Cl-37 ?
- 7) A sample consists of 100g of iron and 58.80 g in NaCl. What is the percent NaCl?
- 8) Which of the following compounds is a totally ionic compound?  
A) HCl    B)  $\text{NaNO}_3$     C) NaCl    D)  $\text{CH}_3\text{COOH}$     E)  $\text{CH}_4$
- 9) Which of the following compounds is a totally covalent compound?  
A) NaOH    B) KCl    C) HCl    D) KH    E)  $\text{UH}_3$
- 10) Which of the following compounds is a mixed (covalent-ionic) compound?  
A)  $\text{NaNO}_3$     B) KCl    C) KH    D)  $\text{UH}_3$     E) HCl
- 11) How much is  $253.30 \text{ }^{\circ}\text{C}$  in kelvins?
- 12) How many molecules are there in 981 g of  $\text{H}_3\text{PO}_4$  ?

- 13) How many molecules are there in 65.8 moles of  $\text{NH}_3$  ?
- 14) How many grams are there in 1.96 mol of  $\text{HCl}$  ?
- 15) How many grams are there in  $5.04 \times 10^{25}$  molecules of  $\text{HNO}_3$  ?
- 16) Calculate the percentage of each of the elements in the compound  $\text{Ca(OH)}_2$  .
- 17) What is the simplest (empirical) formula for a compound that is 41.8% Na , 29.1% S and 29.1% O.
- 18) Convert  $4.63 \times 10^{24}$  nm to Mm.
- 19) The reason that "creation science" is not considered a science (by NAS or AAAS definitions) is due the property that
- A) all of its observations are tentative.
  - B) it does not allow the use of the metric system.
  - C) its facts are incorrect.
  - D) parts of its explanations cannot be challenged.
  - E) some of its observations depend upon the observer.
  - F) its theories cannot be proven.
- 20) For each of the following, label the compound as either an acid or a base by circling the correct answer on the answer sheet.
- |                         |                                |
|-------------------------|--------------------------------|
| $\text{Ca(OH)}_2$       | $\text{HCl}$                   |
| $\text{NH}_3$           | $\text{CH}_3\text{NH}_2$       |
| $\text{H}_3\text{PO}_4$ | $\text{C}_6\text{H}_5\text{N}$ |
| $\text{Fe(OH)}_3$       | $\text{HNO}_3$                 |
| $\text{NaOH}$           | $\text{CH}_3\text{COOH}$       |

NAME \_\_\_\_\_

- 1) Circle the correct letter:    **A**                    **B**                    **C**                    **D**                    **E**
- 2) \_\_\_\_\_ cm
- 3) A) \_\_\_\_\_  
B) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) protons = \_\_\_\_\_                    neutrons = \_\_\_\_\_
- 7) \_\_\_\_\_ %
- 8) Circle the correct letter:    **A**                    **B**                    **C**                    **D**                    **E**
- 9) Circle the correct letter:    **A**                    **B**                    **C**                    **D**                    **E**
- 10) Circle the correct letter:    **A**                    **B**                    **C**                    **D**                    **E**
- 11) \_\_\_\_\_
- 12) \_\_\_\_\_ molecules of  $\text{H}_3\text{PO}_4$
- 13) \_\_\_\_\_ molecules of  $\text{NH}_3$
- 14) \_\_\_\_\_
- 15) \_\_\_\_\_
- 16)  $\text{Ca}(\text{OH})_2$     Ca = \_\_\_\_\_ %                    H = \_\_\_\_\_ %                    O = \_\_\_\_\_ %
- 17) Na       S       O
- 18) \_\_\_\_\_
- 19) Circle the correct letter:    **A**                    **B**                    **C**                    **D**                    **E**                    **F**
- |                              |             |             |                                |             |             |
|------------------------------|-------------|-------------|--------------------------------|-------------|-------------|
| 20) $\text{Ca}(\text{OH})_2$ | <b>Acid</b> | <b>Base</b> | $\text{HCl}$                   | <b>Acid</b> | <b>Base</b> |
| $\text{NH}_3$                | <b>Acid</b> | <b>Base</b> | $\text{CH}_3\text{NH}_2$       | <b>Acid</b> | <b>Base</b> |
| $\text{H}_3\text{PO}_4$      | <b>Acid</b> | <b>Base</b> | $\text{C}_6\text{H}_5\text{N}$ | <b>Acid</b> | <b>Base</b> |
| $\text{Fe}(\text{OH})_3$     | <b>Acid</b> | <b>Base</b> | $\text{HNO}_3$                 | <b>Acid</b> | <b>Base</b> |
| $\text{NaOH}$                | <b>Acid</b> | <b>Base</b> | $\text{CH}_3\text{COOH}$       | <b>Acid</b> | <b>Base</b> |

- 1) **E**
- 2)  $5.1 \times 10^{-6}$  cm
- 3) A)  $2.4 \times 10^2$   
B) 29.7
- 4) 483.3 g
- 5) 4.14 mL
- 6) protons = 17      neutrons = 20
- 7) 37.03%
- 8) **C)**
- 9) **C)**
- 10) **A)**
- 11) 526.45 K
- 12)  $6.03 \times 10^{24}$  molecules of  $\text{H}_3\text{PO}_4$  .
- 13)  $3.96 \times 10^{25}$  molecules of  $\text{NH}_3$  .
- 14) 71.5 g
- 15)  $5.28 \times 10^3$  g
- 16) Ca = 54.1%      H = 2.7%      O = 43.2%
- 17)  $\text{Na}_2 \text{S}_1 \text{O}_2$
- 18)  $4.63 \times 10^9$  Mm
- 19) **F**
- 20)
- |                         |      |                          |      |
|-------------------------|------|--------------------------|------|
| $\text{Ca(OH)}_2$       | Base | HCl                      | Acid |
| $\text{NH}_3$           | Base | $\text{CH}_3\text{COOH}$ | Acid |
| $\text{H}_3\text{PO}_4$ | Acid | $\text{HNO}_3$           | Acid |
| $\text{Fe(OH)}_3$       | Base | $\text{H}_3\text{PO}_4$  | Acid |
| NaOH                    | Base | NaOH                     | Base |