

# HW01

## Question 1

1 pts

The concept and use of *significant figures* allows us to communicate an implied accuracy of a measured amount without specifically writing out a plus or minus ( $\pm$ ) value.

- True
- False

## Question 2

1 pts

A technician in a laboratory records the day's barometric pressure as 747.0 Torr (mm of Hg). How many significant figures are in her recorded number?

- 2
- infinite
- 4
- 3

## Question 3

1 pts

A recipe calls for  $1\frac{1}{2}$  cups of sugar. Which of the following best describes that sugar in terms of matter classification? (check all that apply)

- pure substance
- gas
- liquid
- heterogeneous mixture
- compound
- element
- homogeneous mixture
- solid

## Question 4

1 pts

There are a dozen golf balls in a box. 24 of those boxes will fill a carton. 18 cartons are strapped together to make a palette. A golf retailer orders 5 palettes of golf balls. How many total golf balls did they just order?

## Question 5

1 pts

A chunk of metal is weighed and the mass is found to be 139.5 grams. A large graduated cylinder is nearby and has 25.6 mL of water in it. The chunk of metal is put into the graduated cylinder and the water line (meniscus) is displaced up to 37.9 mL. What is the density of this metal? (answer in g/ml)

## Question 6

1 pts

Looking carefully at a sidewalk you realize that it is best described as \_\_\_\_\_.

- a compound
- a pure substance
- an element
- a heterogeneous mixture
- a homogeneous mixture

## Question 7

1 pts

What is the atomic mass (aka atomic weight) of potassium?  
(yes, DO use a periodic table for this - you will have one on the exam as well)

- 40.08
- 22.99
- 39.10
- 32.07
- 30.97

## Question 8

1 pts

The sequential counting numbers (1, 2, 3,...) for the elements on the periodic table are known as which of the following?

- isotopic abundance
- electron configurations
- atomic masses
- atomic numbers

## Question 9

1 pts

Mixtures can have variable compositions based on the amounts of the different substances that compose them. We communicate the amounts though the use of concentration terms. We chemists have one (and only one) concentration term that we have all agreed to use as a standard.

- True
- False

## Question 10

1 pts

Which of the following statements is true regarding the use of the mole in experimental chemistry?

- The molar mass of an atom has the units of amu, whereas the atomic mass of an atom has the units g/mol
- Converting from molecules to moles is important to chemists so that they can use the "macro-scale" units of grams with the atomic masses found on the periodic table
- An atom is a packet of  $6.022 \times 10^{23}$  moles
- A mole is much smaller than an atom or a molecule, so it is much easier to work with in a laboratory setting

## Question 11

1 pts

What is the molar mass of  $\text{NH}_4\text{Cl}$ ?

- 50.50 g/mol
- 53.49 g/mol
- 49.46 g/mol
- 17.11 g/mol

## Question 12

1 pts

How many moles are in 1.46 kilograms of sulfur (S)?

- 46.72 moles
- .0455 moles
- 45.5 moles
- .0910 moles
- 91.0 moles

## Question 13

1 pts

How many moles are in 142.5 g methanol,  $\text{CH}_3\text{OH}$ ?

- 4.45 mol
- 4.58 mol
- 4566 mol
- No answer text provided.

## Question 14

1 pts

How many moles are in 1.85 L  $\text{H}_2\text{O}$ ? The density of water = 1 kg/ L

- 33.3 mol
- 103 mol
- 12.8 mol
- 0.102 mol

## Question 15

1 pts

4.5 moles of an unknown metal (M) weighs 109.35 g. What is the identity of the metal?

- Al
- Sc
- Mg
- Na
- Li

## Question 16

1 pts

Balance the following reaction:



What are the coefficients of the balanced chemical reaction? Note: if there is no coefficient, report the coefficient as 1.

- 1, 3, 2, 2
- 2, 2, 4, 2
- 2, 3, 4, 2
- 1, 1, 2, 2

## Question 17

1 pts

Consider the following balanced combustion reaction:



How many moles of water are produced in this reaction if 8 moles of oxygen are reacted with excess hydrogen? Assume 100% reaction.

- 16 moles
- 8 moles
- 12 moles
- 4 moles

## Question 18

1 pts

Reactants A and B react to form C in the following balanced generic reaction:



In a particular experimental set-up, reactant B is found to be the limiting reagent. Which of the following must be true?

- Reactant B will run out while there is still excess A remaining
- Reactant B will always be the limiting reagent no matter how much of each reactant you begin with
- There is at least twice the amount of reactant B than A in the beginning of the experiment
- Reactant A and B will run out simultaneously

## Question 19

1 pts

Consider the following reaction:



If 4 moles of  $\text{N}_2$  react with 6 moles of  $\text{H}_2$ , how many moles of  $\text{NH}_3$  are formed?

- 4 moles
- 8 moles
- 5.33 moles
- 12 moles

## Question 20

1 pts

Consider the following balanced reaction:



When 15 moles of  $\text{O}_2$  are reacted to completion with 8 moles of  $\text{C}_2\text{H}_4$ , what is the **mass** of carbon dioxide formed?

- 660 g/mol
- 352 g/mol
- 704 g/mol
- 440 g/mol