

Name _____

Honors Chemistry

____/____/____

Test A - Chapter 1

Part 1. Solve each of the following. Give your answers using the correct number of significant figures. (3 points each)

a. $69.723 + 30.9738$

b. 0.2013×1.4928

c. $[(9.575 - 9.488) \div 9.575] \times 100.$

d. $(2.9979 \times 10^8) \div (7.53 \times 10^{-8})$

e. $11.06 \div 102.906 \times (6.022 \times 10^{23})$

Part 2. Convert each of the following. (3 points each)

a. 3.69 milligrams to kilograms

b. 106.7 megahertz to Hertz

c. 6.50×10^5 micrometers to centimeters

d. 4.800×10^{-7} megagrams to decigrams

Part 3. Perform the following unit conversions. All answers should have three significant figures. (3 points each)

a. 26.2 miles to centimeters

b. 8.00 pints to gallons

c. 88.00 kilopascals to torr

d. $1560.^{\circ}\text{C}$ to Kelvin

Part 4. Solve the following using dimensional analysis. Show all of your work below each problem. Box your final answer. **Answers should be given using three significant digits.** (4 points each)

- a. _____ A certain car has a fuel economy of 34.0 miles per gallon. Calculate the car's fuel economy in kilometers per liter.

- b. _____ The energy content of a bottle of juice bought in Europe is 150. kilojoules per 100.0 mL of juice. Calculate the energy content in kilocalories per gallon.

Part 5. Solve each of the following density problems. **Show all work below the problem. Include units in your answer. Answer must have the correct number of significant figures.**

- a. _____ Platinum has a density of 21.45 g/mL. If a 13.38 gram sample of platinum is dropped in 8.22 mL of water, what will be the new volume of the water and platinum? (3 points)

- b. An empty graduated cylinder has mass of 46.77 grams. An unknown metal is added to the graduated cylinder and the mass of the cylinder and metal is 119.88 grams. Water is added and the total volume of the water and metal was 55.60 mL. The mass of the graduated cylinder, metal and water is 170.22 grams. The density of the water is 0.997 g/cm^3 .

i. _____ What is the mass of the unknown metal? (1 point)

ii. _____ What is the volume of the unknown metal? (3 points)

iii. _____ What is the density of the unknown metal? (2 points)

Part 6. Circle and write on the line the letter of the best answer for each of the following multiple choice questions. (2 points each)

1. _____ A piece of calcite has a mass of 35.6 grams and a volume of 12.9 cm^3 . On which of the following liquids will calcite float?

- | | |
|--|---|
| a. carbon tetrachloride (density = 1.60 g/cm^3) | b. methylene bromide (density = 2.50 g/cm^3) |
| c. neither of the above substances | d. both of the above substances |

2. _____ A fish tank measures 48.0 inches long, 12.0 inches deep and 21.0 inches high. How many gallons of water does it hold?

- | | |
|-----------------|-----------------|
| a. 52.4 gallons | b. 8.11 gallons |
| c. 198 gallons | d. 12.1 gallons |

3. _____ Dew forms on a cold glass of water as water vapor in air condenses on the outside of the glass. Condensation can be considered an:

- | | |
|--------------------------------|--------------------------------|
| a. endothermic chemical change | b. endothermic physical change |
| c. exothermic chemical change | d. exothermic physical change |

4. _____ A student finds the density of lead to equal 10.59 g/mL . The actual density of lead is 11.34 g/mL . Calculate the student's percent error?

- | | | | |
|---------|---------|---------|---------|
| a. 7.5% | b. 7.1% | c. 6.6% | d. 5.5% |
|---------|---------|---------|---------|

5. _____ Gamma decay produces radiation with a wavelength of 1×10^{-12} meters. What is this distance in micrometers?

- | | |
|------------------------------------|------------------------------------|
| a. 1×10^{-6} micrometers | b. 1×10^{-9} micrometers |
| c. 1×10^{-15} micrometers | d. 1×10^{-18} micrometers |

6. _____ Which of the following is an example of a chemical change to a pure substance?

- | | |
|--|------------------------------------|
| a. oxidation of 26.0 grams of lead | b. sublimation of carbon dioxide |
| c. freezing of 26.0 grams of a calcium chloride solution | d. melting of gallium in your hand |

7. _____ Which of the following is an extensive property?

- | | |
|----------------------------------|---------------------------|
| a. very ductile | b. volume of 4.3 L |
| c. density of 3.4 g/mL | d. poor conductor of heat |

8. _____ Which of the following measurements shows good precision & poor accuracy and systematic error, if the actual scientific value is 3.74 cm ?

- | | |
|------------------------------|------------------------------|
| a. 2.75 cm, 3.75 cm, 4.05 cm | b. 3.76 cm, 3.76 cm, 3.75 cm |
| c. 4.02 cm, 4.02 cm, 4.01 cm | d. 4.52 cm, 4.78 cm, 4.01 cm |

9. _____ Which separation technique would be used to separate the colors in a mixture?

- | | | | |
|--------------|--------------|-----------------|-------------------|
| a. decanting | b. magnetism | c. distillation | d. chromatography |
|--------------|--------------|-----------------|-------------------|

- Part 7. Identify each of the following as a compound, monoatomic element, or molecular element. (1 point each)

1. _____ O₂
2. _____ Fe
3. _____ HNO₃
4. _____ C₁₂H₂₂O₁₁

Length

SI unit: meter (m)

1 meter	= 1.0936 yards
1 centimeter	= 0.39370 inch
1 inch	= 2.54 centimeters (exactly)
1 kilometer	= 0.62137 mile
1 mile	= 5280 feet = 1.6093 kilometers
1 angstrom	= 10^{-10} meter = 100 picometers

Mass

SI unit: kilogram (kg)

1 kilogram	= 1000 grams = 2.2046 pounds
1 pound	= 453.59 grams = 0.45359 kilogram = 16 ounces
1 ton	= 2000 pounds = 907.185 kilograms
1 metric ton	= 1000 kilograms = 2204.6 pounds
1 atomic mass unit	= 1.66056×10^{-27} kilograms

Volume

SI unit: cubic meter (m³)

1 liter	= 10^{-3} m ³ = 1 dm ³ = 1.0567 quarts
1 gallon	= 4 quarts = 8 pints = 3.7854 liters
1 quart	= 32 fluid ounces = 0.94633 liter

Temperature

SI unit: kelvin (K)

0 K	= -273.15°C = -459.67°F
K	= °C + 273.15
°C	= $\frac{5}{9}(\text{°F} - 32)$
°F	= $\frac{9}{5}(\text{°C}) + 32$

Energy

SI unit: joule (J)

1 joule	= 1 kg · m ² /s ² = 0.23901 calorie = 9.4781×10^{-4} btu (British thermal unit)
1 calorie	= 4.184 joules = 3.965×10^{-3} btu
1 btu	= 1055.06 joules = 252.2 calories

Pressure

SI unit: pascal (Pa)

1 pascal	= 1 N/m ² = 1 kg/m · s ²
1 atmosphere	= 101.325 kilopascals = 760 torr (mmHg) = 14.70 pounds per square inch
1 bar	= 10^5 pascals