

Name: \_\_\_\_\_  
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## CHEMISTRY 11 UNIT ONE TEST REVIEW




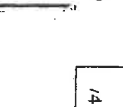



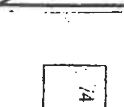

Your Unit 1 test will cover all the material that we have covered until this point, the major topics include:

- Safety (The WHMIS Symbols)
- Nomenclature
- Scientific Notation
- Significant Digits
- SI Base Units
- Multiples of Base Units (eg. Kilo, centi, milli and micro)
- Unit Conversions: single, multiple and metric
- Density Calculations
- Chemical vs. Physical properties, + changes
- Matter- definitions, the matter tree, and separating matter

The test questions that you receive will be based on those given in this worksheet. As well as additional ones. This worksheet will be collected at the start of class on the test day.

**SAFETY:**

1. What do the letters in the acronym WHMIS stand for? Workplace Hazardous Materials Information System
2. For each of the following, write down the appropriate WHMIS symbol and provide an example material that would have this symbol on its label.

			
Explosive Hazard → TNT	Flammable → gasoline	Oxidizing material → H <sub>2</sub> O <sub>2</sub>	Corrosive material → acids
			
Compressed gas → oxy gen tank	Infectious → less severe effects → USPO	Toxicity → 1000 ppm	Environment- mercury → used needles
	Biohazardous infectious material → used needles		

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1. In the space below, write one rule for significant figures and give an example of that rule.  
0.020 → 2 sig figs

2. When the rounding tool is five what are the two rules?

4.5 → 5      4.4 → 4

3. Write either the abbreviation or the name of each of the following measurements.

ABBREVIATION	NAME
Kg	Kilogram
µm	micrometer
s	second
Mol	mole
m	metre
l	Liter

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4. How many sig figs are in each of the following?

0.000026	2
4052.0	5
1200	2
0.07459	4

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5. Express each of the following numbers in scientific notation.

2730	<u>2.73 × 10<sup>3</sup></u>
0.000256	<u>2.56 × 10<sup>-4</sup></u>
602000000000000000000000	<u>6.02 × 10<sup>15</sup></u>
15.2690000	<u>1.52690000 × 10<sup>1</sup></u>

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6. When multiplying or dividing two numbers, the answer is rounded off to the least number of sig figs used in the calculation.

7. Express each of the following in ordinary notation.

$6.53 \times 10^{-3}$	0.00653
$2 \times 10^6$	2000000
$3.4565 \times 10^{10}$	34565000000
$1.01 \times 10^{-5}$	0.00000101

8. Perform the indicated operations, answers in exponential form.

$10^3 \times 10^6$	$10^9$	$10^2 / 10^8$	$10^{-6}$
$10^2 \times 10^5$	$10^7$	$10^7 / 10^3$	$10^4$
$10^1 \times 10^{10}$	$10^{11}$	$10^2 / 10^{-4}$	$10^7$

9. Perform the indicated operations. Convert all answers to scientific notation, showing the correct number of significant digits.

$(5.8 \times 10^3)(3.6 \times 10^2) =$	$2.1 \times 10^3$
$(3.3 \times 10^2)(5.5 \times 10^7) =$	$1.8 \times 10^{-13}$
$(1.5 \times 10^4) =$	$3.3 \times 10^1$
$(4.5 \times 10^4) =$	$6.1 \times 10^7$

10. Using your knowledge of unitary rates, convert the following measurements.

a.  $265 \text{ g} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 0.265 \text{ kg}$   
 b.  $0.00067 \text{ m} \times \frac{1 \text{ km}}{1000 \text{ m}} = 6.7 \times 10^{-7} \text{ km}$   
 c.  $78 \text{ kg} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 78 \text{ kg}$

11. If 3000ml of copper has a mass of 4.389 kg, what is the volume occupied by 100.0 kg of copper?

$$\# \text{ mL} = 100.0 \text{ kg} \times \frac{3000 \text{ mL}}{4.389 \text{ kg}} = 6.8 \times 10^4 \text{ mL}$$

12. What is the cost of 7 dozen eggs if the eggs sell for \$2.59/dozen?

$$\# \$ = 7 \text{ doz} \times \frac{\$2.59}{1 \text{ doz}} = \$18.13$$

13. The gas tank on my ski-doo holds 5.9 liters. If one liter is equal to 0.264 gallons in the USA and gas is \$1.24/gallon. How much would it cost me to fill my tank in the states?

$$5.9 \text{ L} \times \frac{0.264 \text{ gal}}{1 \text{ L}} \times \frac{\$1.24}{1 \text{ gal}} = \$1.93$$

15. The following is a comparison of kilometers driven to the amount of gas pumped into the tank.

Kilometers	Gas pumped (L)
360	60
24	4
72	12

$$\frac{360}{60} = 6 \text{ km/L}$$

$$\frac{24}{4} = 6 \text{ km/L}$$

$$\frac{72}{12} = 6 \text{ km/L}$$

a. Are the quantities proportional? Explain.  
 yes they are all proportional

$$6 \text{ km/L}$$

16. What is the formula for density?

$$D = \frac{M}{V}$$



17. Complete the table given below.

MASS	VOLUME	DENSITY
45g	5ml	9 g/ml
180g	60ml	3g/ml
60g	15ml	4g/ml

18. A solution has a density of 2.5 g/ml. How many grams are needed to obtain:

a) 6ml of solution 20g

b) 10 ml of solution 30g

$$M = D \times V$$

$$a) M = \frac{25 \text{ g}}{\text{mL}} \times 6 \text{ mL} = 15 \text{ g} \approx 20 \text{ g}$$

$$b) M = \frac{25 \text{ g}}{\text{mL}} \times 10 \text{ mL} = 25 \text{ g} \approx 30 \text{ g}$$

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1. Define matter.

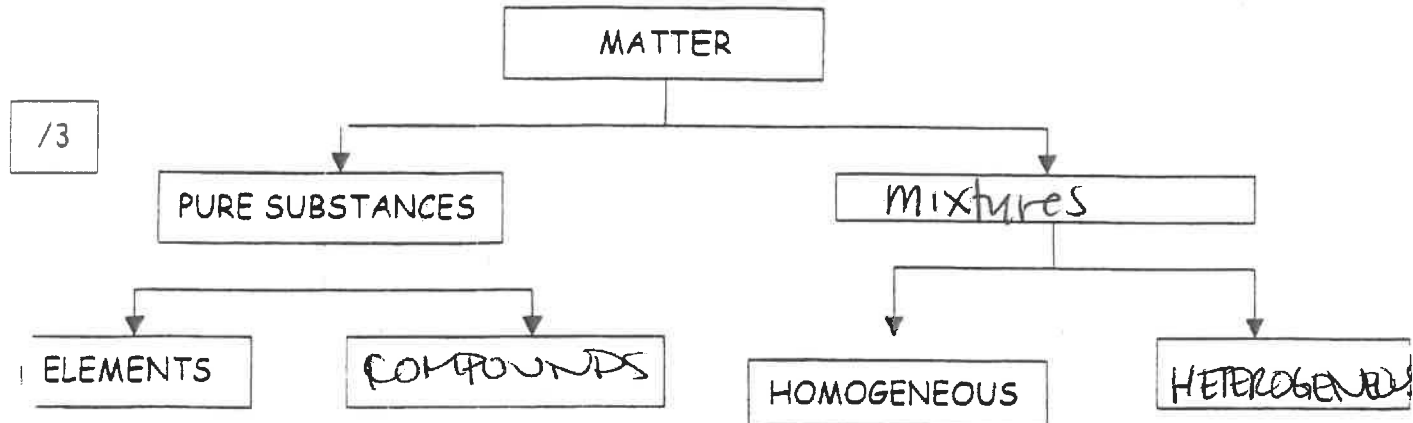
anything that has mass + occupies space.

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2. What are the three physical states of matter.

Solid, liquid + gas

3. Complete the following flow chart.



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4. Classify the following as either chemical or physical properties.

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	PHYSICAL PROPERTY	CHEMICAL PROPERTY
BLUE COLOUR	✓	
DENSITY	✓	
MELTING POINT	✓	
FLAMMABILITY		✓

5. Classify the following as either a physical or chemical change;

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- a. Slicing a pellet of sodium in two physical
- b. A solid block of iron is melted physical
- c. Sugar crystals are dissolved in water physical
- d. Hydrochloric acid reacts with sodium carbonate and bubbles are formed. chemical

6. In class, we discussed 8 different methods of separating matter, give 2 of the methods.

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- |                       |                       |
|-----------------------|-----------------------|
| 1. filtration         | 6. hand separation    |
| 2. distillation       | 7. Solvent extraction |
| 3. gravity separation | 8. evaporation        |
| 4. re-crystallization |                       |
| 5. chromatography     |                       |

# Significant Figures & Calculations

KEY

1. Express the following in proper form scientific notation. Then indicate the correct number of significant figures in the value.

(a) 4907 L 4

(b) 0.000 052 m 2

(c) 7900 g 2

(d) 0.060 30 ft 4

(e) 790.0 lb 4

2. Carry out the following operations and give the answers with the correct number of significant figures. Pay close attention to the units.

(a)  $14.6 \text{ cm} \times 12.2 \text{ cm} \times 9.3 \text{ cm} \Rightarrow 1,656.516$   
 (3) (3) (2) (2)  
 $= \boxed{1700 \text{ cm}^3}$

(b)  $28.0 \text{ m} \times 16.0 \text{ m} \times 7.0 \text{ m} = 3,136$   
 (3) (3) (2)  
 $= \boxed{3100 \text{ m}^3}$

3. A chunk of nickel has a mass of 9.0 g and a volume of 1.01 mL. What is its density?  $D = m \div V$

$D = \frac{9.0 \text{ g}}{1.01 \text{ mL}} = \boxed{8.9 \text{ g/mL}}$

4. The density of copper is 8.9 g/mL. What is the mass of a 10.8 mL piece of copper?  $M = V \cdot D$

$10.8 \text{ mL} \cdot \frac{8.9 \text{ g}}{\text{mL}} = \boxed{96 \text{ g}}$

5. Carry out the following operations and give the answer with the correct number of significant figures.

(a)  $608 \text{ g} + 7 \text{ g} + 0.05 \text{ g} = \boxed{615 \text{ g}}$

(b)  $481.33 \text{ mL} - 37.1 \text{ mL} = \boxed{444.2 \text{ mL}}$

(c)  $6620 \text{ s} + 35.7 \text{ s} + 1.00 \text{ s} = \boxed{6657 \text{ s}}$

(d)  $0.007 \text{ m} + 0.100 \text{ m} + 0.020 \text{ m} = \boxed{0.127 \text{ m}}$

6. Determine the answer with the correct number of significant figures:

$\frac{1.415 \text{ g}}{1.6 \text{ mL}} + \frac{0.240 \text{ g}}{0.311 \text{ mL}} + \frac{40.304 \text{ g}}{0.2113 \text{ mL}}$

$(0.884375) + (0.77170418) + (190.743019)$   
 $= \boxed{192.4 \text{ g/mL}}$

7. Determine the answer to each the following with the correct number of significant figures:

(a)  $8.4 \text{ g} + 3.0 \text{ g} + 4.175 \text{ g} = 15.575 \text{ g}$   
 "3"  
 $= \boxed{5.2 \text{ g}}$

(b)  $\frac{9.00 \times 10^{-23} \text{ units} \times 2.9900 \times 10^{-25} \text{ units}}{2.9 \times 10^{-9} \text{ units}}$

$= \boxed{9.3 \cdot 10^{-39} \text{ units}}$  (2)

(c)  $\frac{(5.9 \times 10^{-12} \text{ u} + 7.80 \times 10^{-13} \text{ u})}{(4 \times 10^{12} \text{ u} + 6.700 \times 10^{13} \text{ u})} = \frac{6.68 \cdot 10^{-12} \text{ u}}{7.1 \cdot 10^{13} \text{ u}}$   
 $= \boxed{9.4 \cdot 10^{-26}}$  (2)

8. The label on a bottle of mood-elevating medication states that each tablet contains 25.0 mg of imipramine. A test conducted by the bureau of standards shows a tablet to contain 28.0 mg. Legally, drug companies are allowed to be within plus or minus 5% of their labelled quantities. (omit)

(a) Give the percentage uncertainty for the imipramine tablets:  
 omit  
 $\frac{28.0 - 25.0}{25.0} \times 100 = \frac{3.0}{25.0} \times 100 = 12\%$

(b) Is the drug company within the legally allowed limits for their tablets?  
 omit  
 $\frac{28.0 - 25.0}{25.0} \times 100 = 12\%$   
 $25.0 \text{ mg} \pm 5\% = 25.0 \text{ mg} \pm 1.25 \text{ mg} = 23.75 \text{ mg} \text{ to } 26.25 \text{ mg}$   
 $28.0 \text{ mg} > 26.25 \text{ mg}$   
 No, the drug company is not within the legally allowed limits.

# Nomenclature :

KEY

- 1 Write the formulas of the following molecular compounds:
- (a) chlorine monoxide  $\text{ClO}$
- (b) tetraphosphorus hexaoxide  $\text{P}_4\text{O}_6$
- (c) arsenic pentafluoride  $\text{AsF}_5$
- (d) nitrogen tri-iodide  $\text{NI}_3$
- 2 Write the names of the following molecular compounds:
- (a)  $\text{P}_3\text{Br}_5$  → triphosphorus pentabromide
- (b)  $\text{B}_2\text{H}_6$  → diboron hexahydride
- (c)  $\text{SO}_3$  → sulphur trioxide
- (d)  $\text{CF}_4$  → carbon tetrafluoride
- 3 Write the formulas of the following hydrated salts:
- (a) sodium sulphate decahydrate  
 $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$
- (b) calcium chloride dihydrate  
 $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$
- (c) copper(II) acetate monohydrate  
 $\text{Cu}(\text{CH}_3\text{COO})_2 \cdot \text{H}_2\text{O}$
- (d) chromium(III) chloride hexahydrate  
 $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$
- 4 Write the names of the following hydrated salts:
- (a)  $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$   
Cadmium nitrate tetrahydrate
- \* (b)  $\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O}$  \*  
Sodium hydrogen phosphate heptahydrate
- (c)  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$   
Copper II sulphate pentahydrate
- (d)  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$   
Iron III nitrate nonahydrate

- 5 Write the formulas of the following acids:
- (a) hydrobromic acid  
 $\text{HBr}$
- (b) chromic acid  
 $\text{HCrO}_4$
- (c) chloric acid  
 $\text{HClO}_3$
- (d) hypochlorous acid  
 $\text{HClO}$
- 6 Write the names of the following acids:
- (a)  $\text{H}_2\text{S}$  → hydrosulphuric acid
- (b)  $\text{HClO}_4$  → Perchloric acid
- (c)  $\text{HNO}_2$  → nitrous acid
- (d)  $\text{HSCN}$  → Thiocyanic acid
- 7 Write the formulas of the following variety of compounds:
- (a) potassium oxide  
 $\text{K}_2\text{O}$
- (b) permanganic acid  
 $\text{HMnO}_4$
- (c) sulphur dioxide  
 $\text{SO}_2$
- (d) ammonium carbonate  
 $(\text{NH}_4)_2\text{CO}_3$
- (e) iron(II) sulphate heptahydrate  
 $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
- \* (f) hydrocyanic acid  
 $\text{HCN}$
- (g) sulphur hexafluoride  
 $\text{SF}_6$
- (h) calcium acetate monohydrate  
 $\text{Ca}(\text{CH}_3\text{COO})_2 \cdot \text{H}_2\text{O}$
- (i) chromium(III) bisulphite  
 $\text{Cr}(\text{HSO}_3)_3$
- (j) magnesium hydroxide  
 $\text{Mg}(\text{OH})_2$