SNC2D1: Grade 10 Academic Science

Chemistry Test date: **Monday, March 24**

Study tips:

- Read through your notes
- Make point form notes to summarize the topics
- Complete the review sheet
- For extra practice . . .

  Do the following **textbook review questions**:

  p. 151 – Q. 1, 2, 3, 5, 6, 7
  p. 158 – Q. 1, 2, 3, 5, 6, 7
  p.168 – Q. 3, 7, 8
  Chap. Review p.174-175 – Q.9, 10, 11, 12, 13, 16, 20
  p. 189 – Q. 1, 4, 5, 7, 8
  p. 198 – Q. 1, 4, 6, 7
  p.206 – Q. 1, 4, 7
  Chap. Review p.214-215 – Q.1-7, 8, 10, 11, 12, 13, 15, 17
  p. 228 – Q. 1, 3, 4, 5, 6, 7, 8
  p. 235 – Q. 1, 2, 3, 4, 6, 7, 8
  p.246 – Q. 1, 2, 4
  Chap. Review p.252-253 – Q.1-7, 8, 9, 10, 11, 12, 13, 16, 18, 19, 20, 21, 22, 26, 28

Chemistry Topics Review

1. Lesson 1A: Lab Equipment
2. Lesson 1B: Safety Symbols & Lab Safety Rules
3. Lesson 2A: Classification of Matter
4. Lesson 2B: Physical & Chemical Change
5. Lesson 3: The Periodic Table, Atomic Structure & Bohr-Rutherford Diagrams
6. Lesson 4: Atoms & Ions / Isoelectric
7. Lesson 5: Lewis Dot Diagrams & Combining Capacity
8. Lesson 6A & 6B: Binary - Ionic Compounds
9. Lesson 7: Molecular Compounds
10. Lesson 8: Ternary - Polyatomic Compounds
11. Lesson9: Binary Acids & Oxyacids
12. Lesson 10A & 10B: Chemical Reactions & Balancing Equations
13. Lesson 11: Types of Chemical Reactions
14. Lesson 12A & 12B & 12C: Acids & Bases, The pH scale, Neutralization Reaction

Chemistry Unit Review

1) Match each **safety symbol** with its meaning (write the letter)

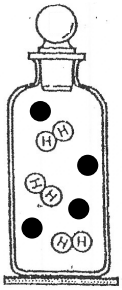
a) Biohazardous Infectious Material
b) Dangerously Reactive Material
c) Corrosive Material
d) Poisonous Material (Immediate and Serious Effects)
e) Oxidizing Material
f) Compressed Gas
g) Poisonous Materials (Long-Term Effects)
h) Flammable and Combustible Material

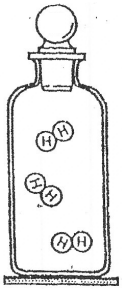
							
							

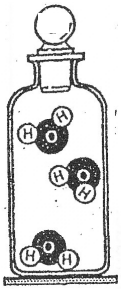
2) State whether each item is an **element (E**), a **compound (C), a solution(S**) or a **mechanical mixture (M).**

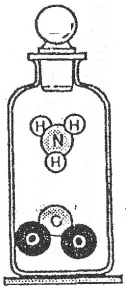
	E / C / S / M		**E / C / S / M**
sodium		Sugar	
Salt water		Salt	
A jar with sand and stones		Tap water	
Oxygen		Pure water	
Pizza		Sugar water	

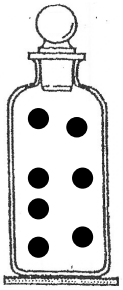
3) Indicate if each bottle contains an **element (E), a compound (C),** or a **mixture (M).**

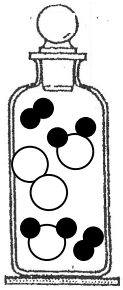

Bottle A _____


Bottle B _____


Bottle C _____


Bottle D _____


Bottle E _____


Bottle F _____

4) Refer to the above bottles and fill in the chart below.

Bottle	No. of atoms	No. of Molecules	Bottle	No. of atoms	No. of Molecules
A			D		
B			E		
C			F		

5) What are the **five clues** of a **chemical change**?

a) _____

b) _____

c) _____

d) _____

e) _____

6) Complete the following chart for each group.

Group	Location in periodic table (group number)	Number of valence electrons	Examples (Name the Elements)
Alkali metals			
Alkaline earth metals			
Halogens			
Noble gases			

7) Where are the **non-metals** and **metals** located in the periodic table?

8) Name all the **metalloids**.

9) Complete the following chart, using your periodic table to help you.

Symbol	Element name	Atomic number	Atomic mass	# of protons	# of neutrons	# of electrons	Electron configuration
	Calcium						
	Sulfur						
	Carbon						
	Fluorine						
	Sodium						
	Helium						
	Aluminum						
	Phosphorus						

10) A(n) _____ is a positively charged ion, which is formed when a metal _____ electrons.

11) A(n) _____ is a negatively charged ion, which is formed when a nonmetal _____electrons

12) Draw a **Bohr-Rutherford diagram** for the **atom** of the following elements:

Mg-25	$^{31}_{15}P$	Ar

13) Draw a **Bohr-Rutherford diagram** for the **stable ions** formed by each of the following atom:

Ca	F	K
Ionic charge: _____ Ionic symbol: _____ Name of the noble gas that is isoelectric with the ion:	Ionic charge: _____ Ionic symbol: _____ Name of the noble gas that is isoelectric with the ion:	Ionic charge: _____ Ionic symbol: _____ Name of the noble gas that is isoelectric with the ion:

14) Use **Lewis dot diagrams** to show how electrons are transferred to form the bonds.

calcium combines with fluorine	sulfur combines with sodium
Chemical formula:	Chemical formula:

15) Show the **bonding** for the following compounds:

Compound Formula	Type of Compound (Ionic or Molecular)	Lewis Dot Diagram (Show sharing or transfer of electron)	Lewis Structure of ions / structural diagram for molecule
$CaCl_2$			
H_2O			

Compound Formula	Type of Compound (Ionic or Molecular)	Lewis Dot Diagram (Show sharing or transfer of electron)	Lewis Structure of ions / structural diagram for molecule
AlP			
NH_3			

16) Write the **chemical formulas** or the **compound names** for the following:

a) Sodium iodide		KCl	
b) Carbon monoxide		$Al(HCO_3)_3$	
c) Nitrogen triiodide		CBr_4	
d) Hydrochloric acid		$KOH_{(aq)}$	
e) Sodium phosphate		$SiCl_4$	
f) Beryllium fluoride		Na_3P	
g) Magnesium bicarbonate		$H_3PO_{4\,(aq)}$	
h) Magnesium oxide		K_2CO_3	
i) Phosphoric acid		$H_2SO^4{}_{(aq)}$	
j) Potassium chlorate		$NH_4OH_{(aq)}$	
k) Beryllium nitrate		$HF_{(aq)}$	
l) Aluminum sulfide		NH_3	
m) Sulfuric acid		FeI_2	
n) Aluminum sulfide		OF_2	
o) Nitric acid		$HNO_{3\,(aq)}$	
p) Potassium carbonate		$Ca(OH)_{2\,(aq)}$	
q) Hydrosulfuric acid		H_2	
r) Iodine		NI_3	
s) Ammonia		Na_2SO_4	
t) Barium chlorate		SCl_2	
u) Trisilicon tetranitride		CH_4	
v) Beryllium nitrite		CCl_4	
w) Lithium phosphide		I_2	
x) Carbon monoxide		CaF_2	
y) Hydrofluoric acid		$CuCO_3$	
z) Methane		H_2S	

17) There are different types of compounds that are formed when atoms bond together. Complete the following chart to show the difference between these types.

Characteristics	Ionic Compound	Molecular Compound
Types of atoms involved		
Types of bond (ionic or covalent)		
Electrons (shared or transferred)		
Dissolve in water (yes or no)		
Conducts electricity		
Melting and boiling points		
Example:		

18) Some elements exist in the form of **diatomic molecules**? What are these elements?

19) Vinegar is a compound. The chemical formula for **vinegar is $H_3C_2O_2H$**

Type of elements present	Number of atoms of each element

20) a) State the **law of conservation of mass**.

b) What does this law force us to have to do to the **chemical equations** when we write them?

21) Examine the following word equation:
Propane + oxygen → carbon dioxide + water

a) List all **reactants** in this reaction.

b) List all the **products** in this reaction.

22) For each of the following word equations, write the **balanced chemical equation** (with states) and **classify the reaction (state the type of reactions)**.

a) Calcium metal reacts with hydrobromic acid to form aqueous calcium bromide and hydrogen gas.
Word Equation:

Balanced Chemical Equation:

Type of reaction: _____

b) Solid aluminum oxide is formed when aluminum metal reacts with oxygen gas.
Word Equation:

Balanced Chemical Equation:

Type of reaction: _____

c) Sodium metal reacts with aqueous calcium oxide to produce aqueous sodium oxide and calcium metal.
Word Equation:

Balanced Chemical Equation:

Type of reaction: _____

d) Nitrogen gas and liquid iodine are formed from nitrogen triiodide gas.
Word Equation:

Balanced Chemical Equation:

Type of reaction: _____

e) Butane (C_4H_{10}) gas reacts with oxygen gas to produce liquid water and carbon dioxide gas.
Word Equation:

Balanced Chemical Equation:

Type of reaction: _____

23) Classify each of the following reactions, and write the **balanced chemical equations**.

a) Zinc + hydrochloric acid → hydrogen + zinc chloride

Type of reaction: _____

Balanced Chemical Equation:

b) Calcium carbonate + hydrochloric acid → carbonic acid + calcium chloride

Type of reaction: _____

Balanced Chemical Equation:

c) Aluminum + copper (II) chloride → copper + aluminum chloride

Type of reaction: _____

Balanced Chemical Equation:

d) Barium + sulphur → barium sulphide

Type of reaction: _____

Balanced Chemical Equation:

e) Bromine + sodium iodide → iodine + sodium bromide

Type of reaction: _____

Balanced Chemical Equation:

f) Barium nitrate + sodium sulphide → barium sulphide + sodium nitrate

Type of reaction: _____

Balanced Chemical Equation:

g) Lithium carbonate → carbon dioxide + lithium oxide

Type of reaction: _____

Balanced Chemical Equation:

h) Calcium + water → hydrogen + calcium hydroxide

Type of reaction: _____

Balanced Chemical Equation:

i) Sulfur trioxide + water → sulfuric acid

Type of reaction: _____

Balanced Chemical Equation:

24) What happens when a metal is added to the **solution** of an **ionic compound**? Explain with an example.

25) ***Predict*** the products, and write **balanced chemical equations**.
   a) Magnesium is added to hydrochloric acid.

   b) Bromine is added to sodium iodide solution.

26) The products of **neutralization reactions** are always _____ and _____.
   Predict the products and ***balance*** the equations.

   a) ___$NaOH_{(aq)}$ + ___$HCl_{(aq)}$ →

   b) ___$Mg(OH)_{2\,(aq)}$ + ___$H_2SO_{4\,(aq)}$ →

   c) ___$Al(OH)_{3\,(aq)}$ + ___$H_2S_{(aq)}$ →

   d) ___$Ca(OH)_{2\,(aq)}$ + ___$H_3P_{(aq)}$ →

   e) ___$H_2SO_{4\,(aq)}$ + ___$NaOH_{(aq)}$ →

27) What does **pH measure**?

28) a) If apple juice has a pH of 5 and vinegar has a pH of 3, which is more acidic? _____

   b) How many **more hydrogen ions** are there in the more acidic substance? _____

29) How much **more acidic** is a solution with a pH of 4.5 than a solution with a pH of
   a) 5.5?
   b) 6.5?

30) How much **more basic** is a solution with a pH of 12.5 than a solution with a pH of
   a) 10.5?
   b) 8.5?

31) Use the physical or chemical properties identified below to classify each solution as acidic, basic, or neutral.
   a) Reacts with magnesium to produce bubbles and conducts electricity
   b) Blue litmus stays blue and red litmus stays red
   c) Has a pH of 10 and blue litmus stays blue
   d) Taste bitter and does not react with magnesium

32) Explain the **differences between acids and bases**.

Property	**Acids**	**Bases**
Ion that is present in solution		
Reactivity with metals		
Electrical conductivity		
Taste		
Feel/touch/texture		
pH range		
Chemical indicators: **Phenolphthalein** will turn? **Bromothymol blue** will turn? **Methyl Orange** will turn? **Blue / Red Litmus paper** will turn?		