Name: KEY

SCIENCE 9 Practise Test – Unit B: Matter and Chemical Change

Part A – Written Response

Written Response 1

a.) Fill in the missing information from the table below (5 marks)

Chemical Formula	Type of compound (ionic or molecular?)	Chemical name
K_2S	ionic	potassium sulfide
Rb_3P	ionic	rubidium phosphide
N_2O_3	molecular	dinitrogen trioxide
SF_4	molecular	sulphur tetrafluoride
ZnF_2	ionic	zinc fluoride

b.) What did J.J. Thomson call his model of the atom? Describe and sketch what the model looked like. **(3 marks)**

"Raisin bun model" or "plum pudding model". Thomson thought atoms were dense spheres filled with positively charged fluid and negatively charged particles.

Figure 2.14 J.J.Thomson's model was the first one that described particles smaller than atoms. This model represented the atom as a positive sphere with electrons scattered throughout it—like raisins mixed in a baked bun.

Written Response 2

Guacamole is a delicious dip made from avocados, chopped onions, lemon juice, and spices. If it is left uncovered for too long, it begins to turn from green to brown and will not be able to return to green no matter how well it is covered.

a.) **Evaluate** whether this is a chemical or physical change. Justify your answer. **(2 marks)**

Probably a chemical change because there was a color change that is difficult to reverse. Of course, we can't be sure whether it was a physical or chemical change unless a new substance has been formed (we would need to see the word or chemical equation to know for sure)

b.) **Classify** guacamole as either an element, compound, mechanical mixture (heterogeneous), or solution (homogeneous). Justify your answer. **(2 marks)** **Guacamole is a mechanical mixture because you can see the different parts – chopped onions look different from mashed avocado. You would also be able to see the different spices.**

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Written Response 3

a.) Write the chemical equation for the following word equation: methane (carbon tetrachloride – this should say tetrahydride!) gas reacts with oxygen gas to produce carbon dioxide and water (dihydrogen monoxide) vapour. Make sure to indicate states of matter. (2 **marks).**

$CH_{4(g)} + O_{2(g)} \rightarrow CO_{2(g)} + H_2O_{(g)}$

b.) Write the word equation for the following chemical equation: $Ca_{(s)} + Cl_{2(g)} \rightarrow CaCl_{2(s)}$ **(2 marks)**

Calcium metal + chlorine gas → solid calcium chloride

Written Response 4

a.) What will be the chemical formula for the compound that forms between sodium and sulphur? Show your work**. (2 marks)**

Na^{1+} S^{2-} Na_2S

Na^{1+}

_____

2+ 2-

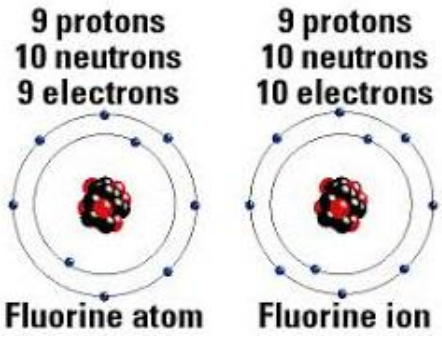
b.) Compare and contrast ionic and molecular compounds on the basis of the following properties: conductivity, solubility, and melting point. You may draw a table/Venn diagram to illustrate your answer**. (3 marks)**

IONIC	MOLECULAR
conducts electricity	does not conduct electricity
usually soluble	usually insoluble
high melting point	low melting point

Written Response 5

Describe a fluoride ion. How is it different from a neutral atom of fluorine? How many electrons does a fluoride ion have? Is it a cation or an anion? **(3 marks)**

A fluoride atom has no charge. It has 9 electrons. A fluoride ion is a fluoride atom that has gained an extra electron, giving it a 1- charge. It has 10 electrons. This will be an anion because it is negatively charged.



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Part B – Multiple Choice

*Use the following information to answer the **next three** questions*

Dmitri Mendeleev organized the periodic table in such a way that gaps were left for elements not yet discovered. Today we know that there are several patterns or trends in the periodic table.

1. Up and down columns on the periodic table are called

A. rows
B. groups
C. periods
D. trends

2. Elements of the same chemical family share similar

A. colors
B. protons
C. neutrons
D. properties

Numerical Response

1 We discussed 4 chemical families on the periodic table: noble gases (1), halogens (2), alkali metals (3), and alkaline earth metals (4). From **left to right** on the periodic table, in what order are these chemical families?

3 4 2 1
Left most right most

3. An atom contains 3 subatomic particles: electrons, protons, and neutrons. The subatomic particles that exist in the nucleus of the atom are:

A. electrons only
B. protons and electrons
C. protons and neutrons
D. neutrons only

4. The most unreactive chemical family are the

A. noble gases
B. halogens
C. alkaline earth metals
D. alkali metals

5. On the periodic table, metals are on the _____ of the "staircase" and non-metals are on the _____ of the "staircase".

A. right; left
B. left; right
C. center; right
D. center; left

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6. All of the following are evidence that a chemical change has taken place except
   A. a new odour is produced
   B. a material with new properties forms
   C. a substance changes state
   D. the change is difficult to reverse

Numerical Response

2 Write the missing number for each column on the line below it.

Atomic Symbol	Atomic Number	Protons	Neutrons	Electrons	Mass Number
B	W	X	Y	Z	

5 (W) 5 (X) 6 (Y) 5 (Z)

Numerical Response

3 Write the missing number for each column on the line below it.

Atomic Symbol	Atomic Number	Protons	Neutrons	Electrons	Mass Number
Be		W	**X**	Y	Z

4 (W) 5 (X) 4 (Y) 9 (Z)

*Use the following information to answer the next **two** questions*

A student made the following observations about an unknown substance during a lab activity:

1. Appears dull greyish
2. reacts with acid to form carbon and water
3. Has a low melting point
4. Does not conduct electricity

Numerical Response

4 In ascending order (lowest to highest), the observations that are examples of physical properties are:

1 3 4

7. What type of compound is the unknown substance likely to be?
   A. ionic
   B. molecular
   C. neither ionic nor molecular
   D. there is not enough information to tell

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8. Which of the following is a chemical change?
    A. salt dissolving in water
    B. baking a cake
    C. crushing a cake
    D. melting chocolate

9. The physical property that occurs when a substance can be hammered into a sheet is called:
    A. hardness
    B. ductility
    C. malleability
    D. conductivity

10. Niels Bohr proposed a model of the atom that involved electrons rotating around the nucleus in fixed pathways called electron shells. What was this model called?
    A. billiard ball model
    B. plum pudding or raisin bun model
    C. electron cloud model
    D. solar system model

*Use the following information to answer the **next two** questions*

A student performed a chemical reaction to test the law of conservation of mass. The mass of her reactants was 12.2g.

11. The _____ are shown on the left side of the chemical equation while the _____ are shown on the right
    A. reactants; products
    B. products; reactants
    C. reactions; precipitates
    D. precipitates; reactions

12. According to the law of conservation of mass, the mass of the ending materials from the student's experiment will be
    A. 14.4g
    B. a little more than the starting materials
    C. a little less than the starting materials
    D. 12.2g

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*Use the following information to the answer the **next two** questions*

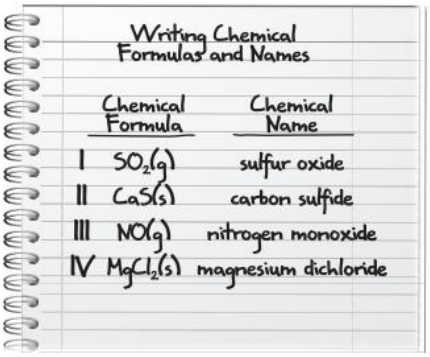
Energy changes occur in all chemical reactions as a result of chemical bonds being broken or formed. A student observed the following reaction and felt heat as the reaction occurred.

$$H_2O_{2(l)} \rightarrow H_2O_{(g)} + O_{2(g)}$$

13. This reaction is
    A. endothermic because energy is released
    B. endothermic because energy is absorbed
    C. exothermic because energy is released
    D. exothermic because energy is absorbed

Use the following information to answer the next question

Chris listed four chemical formulas and their matching chemical names in his notebook, as shown below.



According to Chris' teacher, he named only one of the compounds correctly.

14. Which of the compounds did Chris correctly name?
    A. I
    B. II
    C. III
    D. IV

15. Combustion and corrosion are similar because they both
    A. have a metal as a reactant
    B. release oxygen as a product
    C. require oxygen as a reactant
    D. release carbon dioxide as a product

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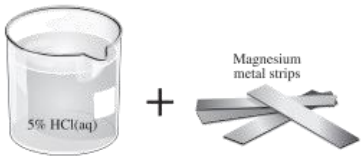
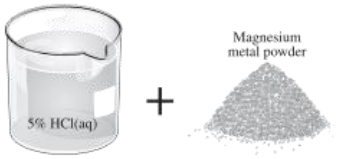
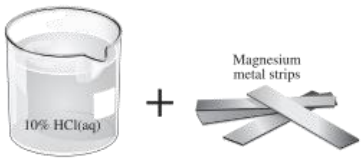
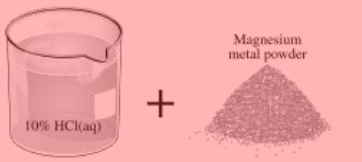
Use the following information to answer the next question

When magnesium metal is placed in hydrochloric acid, hydrogen gas bubbles are produced.

16. Which of the following combinations of reactants would have the fastest reaction rate?

Row	
A.	
B.	
C.	
D.	

Use the following information to answer numerical response 5

Substance	Conducts Electricity	State at Room Temperature
X	No	Gas
Y	Yes	Solid
Z	No	Liquid

Numerical Response

5 Classify the substances above as ionic or molecular using the following code.

1 = Ionic
2 = Molecular

X	Y	Z
2	1	2

(Record your answer in the numerical-response section on the answer sheet.)