التّقييم التّشخيصيّ الوطنيّ

الصّفّ: التاسع اساسي – الشّعبة: .....
المادّة: الكيمياء
اللغة الاجنبية: الانكليزية

اسم الثانوية/المدرسة: ..... **اسم المتعلّم: .....**

التاريخ: ..... **المدّة: 75 دقيقة**

This exam consists of five exercises with a total score of 100 points.

Exercise I (23 points) **Ammonia**

Ammonia (NH_3) is a colorless gas composed **of** nitrogen (N) and hydrogen (H). It has a very strong, pungent odor often associated with urine. Ammonia is a common ingredient in many household cleaning products and is also used in the industrial production of nitric acid (HNO_3). Both nitric acid and ammonia are key raw materials for fertilizer production; ammonium nitrate (NH_4NO_3) is a prime example. This compound is also used in the manufacture of explosives.

1. List two uses of ammonia from the text.

2. Classify the following substances as elements or compounds: ammonia (NH_3), hydrogen (H), nitric acid (HNO_3), nitrogen (N), and ammonium nitrate (NH_4NO_3). Justify your answer.

3. A nitrogen atom has 7 protons and 7 neutrons in its nucleus.

3.1. Determine the atomic number and the mass number of the nitrogen atom.

3.2. Give the symbolic representation of the nitrogen atom.

Exercise II (7 points)

Match each term in Column A with its correct definition in Column B. On your answer sheet, write the letter from Column B next to the corresponding number in Column A.

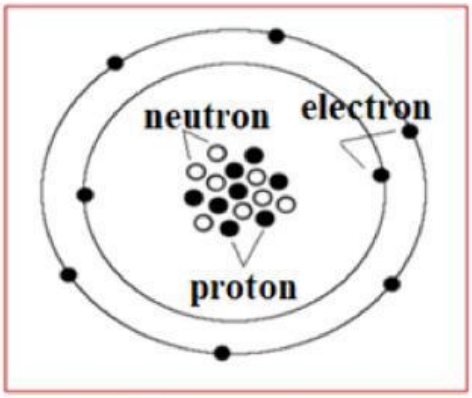
Column A	Column B: Definitions
1-Proton	a-A positively charged ion.
2-Neutron	b-A neutral particle located in the nucleus.
3-Electron	c- A negatively charged particle with very little mass.
4-Polyatomic ion	d-A negatively charged ion.
5-Cation	e-The number of protons in the nucleus of an atom.
6-Anion	f-A positively charged particle located in the nucleus.
7-Atomic number	g-An ion composed of many atoms.

Exercise III (23 points) **Salts**

In the Salar de Uyuni in Bolivia, salt is mined on a large scale from a vast salt flat. It is harvested through a process of evaporation, whereby water evaporates and leaves the salt behind. The Salar contains vast reserves of various salts, including sodium chloride, potassium chloride, and magnesium chloride.

Refer to the text and use your own knowledge to answer the following questions:

1. Is the evaporation of water a chemical or physical change? Justify your answer.
2. List the names of the salts mentioned in the text.
3. Write the chemical formula for each salt mentioned, noting that they are ionic compounds.
4. A water molecule consists of two hydrogen atoms and one oxygen atom. Write the chemical formula for water.
5. Document - 1 shows the atomic model of an oxygen atom (O).



Document-1

5.1. Indicate the composition of the oxygen atom.

5.2. Calculate the mass number (A) of this oxygen atom.

5.3. Write the symbolic representation for this oxygen atom.

Exercise IV (24 points) **Chemical Reactions**

For each chemical reaction below, answer the following questions:

Reaction 1

Solid copper metal, Cu(s), reacts with an aqueous silver nitrate solution, $AgNO_3(aq)$. This reaction produces a deposit of silver metal on the copper wire and turns the solution blue due to the formation of copper (II) ions.

The reaction is represented by the following equation:

$Cu\ (s) + AgNO_3\ (aq) \rightarrow Ag\ (s) + Cu(NO_3)_2\ (aq)$

a-Indicate the reactants and the products of this reaction.

b-Balance the chemical equation.

Reaction 2 : $Mg_{(s)}+O_{2(g)} \rightarrow MgO_{(s)}$

a-Translate the given chemical equation into a word equation.

b-Magnesium is a metal. Choose, from the following, the characteristics of magnesium:

-Malleable -Ductile -Insulator

-Good conductor of electricity - A gas -Poor conductor of heat

c-The product, magnesium oxide (MgO), does not have any of these metallic characteristics of magnesium. Explain why.

Reaction 3

Ammonia gas (NH_3) reacts with oxygen gas (O_2) to produce nitric oxide (NO) and water vapor (H_2O).

a-Write the chemical equation for this reaction.

b-Balance the chemical equation.

Exercise V (23 points) Effect of Platinum

Industry makes wide use of catalysts, particularly those that allow companies to save on energy costs by enabling large quantities of a product to be produced at lower temperatures. A key example is the production of sulfuric acid (H_2SO_4), which is widely used in the steel, fertilizer, and petroleum industries.

One step in the production of sulfuric acid involves the formation of sulfur trioxide (SO_3) from sulfur dioxide (SO_2) and oxygen.

The rate of this reaction is quite slow, even at high temperatures. However, the reaction has been made economically viable through the use of platinum catalyst, which greatly increases the reaction rate.

1. Referring to the text, list the following:

1.1. One industrial use of catalysts.

1.2. The role of platinum in the formation of SO_3

2.For the reaction involved in the formation of SO_3:

2.1. Indicate the reactants and the products.

2.2. Write the word equation for the reaction.

2.3. Write the balanced chemical equation.

2.4. Indicate the type of reaction.

3. Based on your knowledge, list two factors that affect the rate of a chemical reaction.