WORKSHEET 1

CHAPTER 5 – CLASSIFICATION OF ELEMENTS

A. Tick (✓) the correct option.

1. Groups of elements having similar properties in Dobereiner's classification of elements were called
   a. Octaves b. Groups c. Periods d. Triads.
2. In Newland's classification, the then known elements were arranged in the order of increasing
   a. Atomic number b. Melting point c. Atomic mass d. Density.
3. Eka-aluminium has properties similar to
   a. Scandium b. Gallium c. Germanium d. Thallium.
4. Silicon exhibits some properties of both metals and non-metals. Hence, it is a
   a. Semi-metal b. Pseudo-metal c. Noble metal d. None of these
5. In the modern periodic table, non-metals are found
   a. On right hand side towards the top
   b. On the left hand side towards the top
   c. In the middle of the table
   d. On left hand side towards the bottom

B. Fill in the blanks.

1. Chlorine, bromine and _____ form a triad.
2. The vertical columns in Mendeleev's periodic table were known as _____
3. Atoms having same atomic number but different atomic masses are known as _____
4. Both chlorine and fluorine have _____ electrons in their valence shells.
5. Atomic size of elements generally _____ down the group.

C. State whether the following statements are true or false.

1. In Dobereiner's triads, when the elements were written in the order of increasing atomic masses, the atomic mass of the middle element was roughly the average of the atomic masses of the other two elements.
2. Silicon is a metal.
3. The columns in modern periodic table are known as periods.
4. Elements in the same group contain the same number of valence electrons.
5. The metallic character increases down the group.

Name: ..... Teacher's signature: .....

Class: X Date: .....

D. Match the following.

1.	Electrons present in the valence shell	Eletronegativity
2.	Most abundant element in the earth's crust	Argon
3.	Energy required to lose the most loosely bound electron	Valence electrons
4.	Tendency of an atom in a molecule to attract the shared pair of electrons towards itself	Oxygen
5.	Completely filled valence shell	Ionisation energy

E. Answer the following.

Very Short Answer Questions

1. What is the modern periodic law for classification of elements?
2. What are semi-metals? Give any two examples.

Short Answer Questions

1. Give any two drawbacks of Newland's Law of Octaves.
2. How do the following vary along a group?
   a. Atomic size
   b. Valency

Long Answer Questions

1. State any three drawbacks of Mendeleev's periodic table.
2. Consider the elements Li, Be, B, C, N, O, F, Ne. Answer the following questions
   a. Which element(s) will form cations?
   b. Which element(s) will exist as monoatomic gas?
   c. Which element is an alkali metal?
   d. Which element is the most electronegative?

ANSWERS

WORKSHEET 2

A. Tick (✓) the correct option.

1. d
2. c
3. b
4. a
5. a

B. Fill in the blanks.

1. iodine
2. groups
3. isotopes
4. seven
5. increases

C. State whether the following statements are true or false.

1. T
2. F
3. F
4. T
5. T

D. Match the following.

1. Electrons present in the valence shell	Valence electrons
2. Most abundant element in the earth's crust	Oxygen
3. Energy required to lose the most loosely bound electron	Ionisation energy
4. Tendency of an atom in an moecule to attract the shared pair of electrons towards itself	Eletronegativity
5. Completely filled valence shell	Argon

E. Answer the following.

Very Short Answer Questions

1. The modern periodic law for classification of elements can be stated as follows:

   Properties of elements are a periodic function of their atomic number.

2. Elements, which exhibit some properties of both metals and non-metals are known as semi-metals. Silicon and germanium are semi-metals.

Short Answer Questions

1. The drawbacks of Newland's Law of Octaves are as follows:
   a. The Law of Octaves was applicable only up to calcium, as after calcium every eighth element did not possess properties similar to that of the first.
   b. It was Newlands that only 56 elements existed in nature and no more elements would be discovered in the future. But later, several new elements were discovered, whose properties did not fit into the Law of Octaves.
2. a. As we move down a group, the atomic size of elements increases. This is because new shells are added as we move down the group.
   b. Valency of an element is determined by the number of electrons present in the valence shell of its atom. Since in a group, atoms of all elements contain the same number of valence electrons, so, valency of elements reains the same as we move down a group.

Long Answer Questions

1. The drawbacks of Mendeleev's periodic table are as follows:
   a. ***Discrepancy in periodicity:*** The arrangement of elements in the order of increasing atomic masses is not maintained in the following cases and the cause of periodicity put forward by Mendeleev is not tenable.

Pair I	
Co	Ni
58.93	58.71
Pair II	
Te	I
127.6	126.9

   In these pairs, the elements with higher atomic masses have been placed before elements of lower atomic masses. Mendeleev's periodic law cannot explain these anomalies of reverse order of arrangements of elements. These anomalies occurred due to placing these in their correct group on the basis of their chemical properties.
   b. ***Position of hydrogen:*** Mendeleev placed hydrogen in group I A. But hydrogen exhibits close similarities in properties with the elements of both group I A and VII A. Hence, the position of hydrogen in Mendeleev's Periodic Table is not correctly defined.
   c. ***Position of isotopes:*** Isotopes of the same element have similar chemical properties and different atomic masses and hence they should be placed in different groups according to the Mendeleev's periodic law. However, Mendeleev did not provide separate places to the isotopes of an element. Isotopes were discovered long after Mendeleev proposed his periodic table.
2. a. The elements lithium and beryllium will form cations.
   b. The element neon will exist as a monoatomic gas.
   c. Lithium is an alkali metal.
   d. Fluorine is the most electronegative element.