UNIT 1

CHEMISTRY AND ITS IMPORTANCE

Unit Outcomes

After completing the unit, you will be able to

- define chemistry;
- describe its' scope;
- discuss the relationships between chemistry with physics biology, medicine geology and other subjects;
- describe the application of chemistry in the field of agriculture, medicine, food production and building construction;
- name some common chemical industries in Ethiopia and their product.

Since chemistry is so fundamental to our world, it plays a role in everyone's lives and touches almost every aspect of our existence in some way. Chemistry is essential for meeting our basic needs such as food, clothing, shelter, health, energy, clean air, water, and soil. The question is how?

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In this unit, the defi nition and the scope of chemistry, the relationship between chemistry and other natural sciences, the role it plays in production and in the society, and some common chemical industries in Ethiopia and their products are presented thoroughly

1.1 Definition and Scope of Chemistry

In this section two aspects of chemistry are going to be dealt with. The first is definition of chemistry, which will be followed by the scope of chemistry. We shall begin by defi ning chemistry first.

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1.1.1 Definition of Chemistry

Chemistry is the science that deals with the properties, composition, and structure of substances (elements and compounds), the transformations they undergo, and the energy that is released or absorbed during these processes.

A substance is a particular kind of matter with uniform properties. Example, gold, silver, water, soap, table salt, etc (Figure 1.1).

Matter is a physical substance, that which occupies space and possesses rest mass. Example, book, pencil, television, stool, etc.

The property of a substance is its attribute, quality, or characteristic. Every substance, in the universe in which we live, has its own properties by which we can distinguish it from other substances. This is because every substance has its own unique composition and structure. Example, water is a substance that has no color, taste, and shape.

Composition is the nature of something's ingredients or constituents; how a whole or mixture is made up. Example, table salt is chemically composed of the elements sodium and chlorine. The stainless-steel spoons are solid solution (alloy) of chromium, carbon and other elements.

The arrangement and relationships between the parts or elements of something complex is known as its structure. Example, the school buildings are made up of roof, ceiling, doors,

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windows, walls, and floor arranged in a certain order. The arrangement of each of these parts are known as the structure of the school building.



Salt Sulphur Gold Silver

Figure 1.1 Substances around us.

Every substance in our environment is continuously changing from time to time due to both external and internal forces. Due to this change, it transforms from one form into the other. The transformation of a substance is a marked change in form, nature, or appearance. These transformations are accompanied by energy changes.

Multiple Choice Questions

1 **Why is chemistry considered fundamental to our world?**

a) It is only used in laboratories b) It plays a role in everyone's lives

c) It affects only scientists d) It deals only with metals

2 **Which of the following is NOT a basic need met by chemistry?**

a) Food b) Shelter c) Clothing d) None

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3 **Chemistry is the science that deals with:**

a) Stars and planets

b) Properties, composition, structure, and transformations of substances

c) Human behaviour

d) Ancient history

4 **A substance is:**

a) Something imaginary

b) A kind of matter with uniform properties

c) A random mixture

d) Only liquid forms of matter

5 **Which of the following is NOT an example of a substance?**

a) Gold b) Soap c) Table salt d) Pencil

6 **Matter is defined as:**

a) Something without mass

b) Physical substance that occupies space and has mass

c) Something invisible

d) A type of energy

7 **Which of the following is NOT an example of matter?**

a) Book

b) Television

c) Stool

d) Light

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8 **The property of a substance refers to its:**

a) Quantity only

b) Attribute, quality, or characteristic

c) Price in the market

d) Weight only

9 **Every substance can be distinguished from another because:**

a) They have unique composition and structure

b) They look different in size

c) They are all liquids

d) They are all mixtures

10 **Which of the following is a property of water mentioned in the reading?**

a) Has color

b) Has taste

c) Has shape

d) None of the above

11 **Composition refers to:**

a) The color of a substance

b) The nature of ingredients or constituents

c) The amount of energy absorbed

d) The size of the substance

12 **Table salt is chemically composed of:**

a) Hydrogen and Oxygen

b) Sodium and Chlorine

c) Carbon and Iron

d) Silver and Gold

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13 **Stainless steel spoons are examples of:**

a) Pure substances

b) Mixtures of water and salt

c) Solid solutions (alloys) of chromium, carbon, and other elements

d) Natural wood products

14 **Structure refers to:**

a) Arrangement and relationships of parts or elements

b) The color of an object

c) The smell of substances

d) Only the outside appearance

15 **Which example was given to explain structure?**

a) A book on a table

b) The arrangement of a school building's parts

c) A bottle of water

d) A gold ring

16 **Substances in our environment are:**

a) Always unchanging

b) Continuously changing due to internal and external forces

c) Completely stable forever

d) Only transformed by humans

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17 **Transformation of a substance means:**

a) A marked change in form, nature, or appearance

b) Staying the same

c) Becoming invisible

d) Increasing in price

18 **What usually accompanies transformations of substances?**

a) Money exchange b) Energy changes

c) No effect at all d) Physical damage only

19 **An example of matter is:**

a) Light b) Heat c) Air d) Shadow

20 **Which statement best summarizes the definition of chemistry?**

a) Study of stars and space

b) Study of human societies

c) Study of substances, their properties, composition, structure, transformations, and energy changes

d) Study of literature and arts

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