Unit 1 · Fundamentals of Chemistry

WORKSHEET

Full marks 33

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

1 Key words [4]

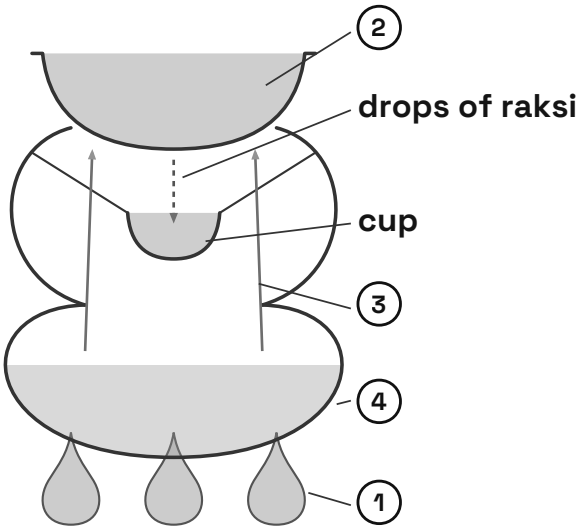
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

-ite	**anion**	**atomic mass unit**	**atomicity**	**cation**	**compound**	**empirical formula**
formula unit	**isotopes**	**mixture**				

A pure substance made of two or more elements combined in a fixed proportion by mass is a _____. The number of atoms in one molecule of a substance is its _____. Atoms of the same element with different numbers of neutrons are _____. One _____ is $\frac{1}{12}$ of the mass of one atom of carbon-12. A positive ion, also called a basic radical, is a _____. When an element forms two oxyanions, the one with fewer oxygen atoms ends in _____. The simplest whole-number ratio of the atoms in a compound is its _____. An ionic compound such as NaCl has no molecules; its smallest repeating unit is a _____.

2 Label the diagram [2]

The diagram shows a raksi still. Write the words that belong in place of 1 to 4. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. The Stock name of the stannic ion, Sn^{4+}, is: [1]

a. tin(II) **b.** stannous

c. tin(IV) **d.** tin(I)

ii. Which of these is an acid radical? [1]

a. Mg^{2+} **b.** NH_4^+

c. HCO_3^- **d.** K^+

iii. How many atoms are there in one formula unit of ammonium phosphate, $(NH_4)_3PO_4$? [1]

a. 12 **b.** 15

c. 20 **d.** 23

iv. What is the percentage of oxygen by mass in magnesium oxide, MgO? (Mg = 24, O = 16) [1]

a. 16% **b.** 40%

c. 50% **d.** 60%

v. A compound has the empirical formula CH_2O and a molecular mass of 150. Its molecular formula is: [1]

a. $C_2H_4O_2$ **b.** $C_3H_6O_3$

c. $C_5H_{10}O_5$ **d.** $C_6H_{12}O_6$

4 Short answers [7]

Write short answers to the following questions.

a. The relative atomic mass of magnesium is 24.305. Why is it not a whole number, and why does it have no unit? [2]

b. What is the difference between 2N, N_2 and $2N_2$? How many nitrogen atoms does each stand for? [2]

c. Write the formulas of: a. magnesium nitride, b. ammonium dichromate, c. lead(II) nitrate. [3]

5 Long answer [4]

Write a long answer to the following question.

What is an ion? Distinguish a cation from an anion. Iron has variable valency: name its two ions in the classical way and by the Stock system, and write the formulas of iron(II) sulphate and iron(III) chloride.

6 Numerical problems [8]

Solve the following problems. Show your working. Take H = 1, O = 16, Mg = 24, S = 32.

a. Epsom salt is magnesium sulphate heptahydrate, $MgSO_4 \cdot 7H_2O$. [4]

i. Find its relative formula mass.

ii. Find the percentage of water in it.

iii. Find the percentage of magnesium in it.

iv. What mass of water is given off when 12.3 g of Epsom salt is heated until all its water is driven off?

Answer:

b. i. Natural silver is 51.8% silver-107 (atomic mass 106.91) and 48.2% silver-109 (atomic mass 108.90). Find the relative atomic mass of silver. **[4]**

ii. Lithium has two isotopes, lithium-6 (6.015) and lithium-7 (7.016), and its relative atomic mass is 6.94. What percentage of lithium atoms are lithium-6?

Answer: _____

7 Think **[3]**

Two white solids from a laboratory shelf both turn out to be 40.0% carbon, 6.7% hydrogen and 53.3% oxygen by mass. Pratiksha says they must be the same compound. Is she right? What else would you measure to tell them apart?

8 Activity: Chemistry on the kitchen shelf (not marked)

Find three packets at home whose labels name a chemical: table salt, baking soda, a medicine or a fertilizer. For each, find its formula (from the label or the unit), work out its relative formula mass, and the percentage of one element in it.

Product	Chemical	Formula	Relative formula mass	% of one element

Which of your products has the largest percentage of one element, and why?