

<u>BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034</u>

SUBJECT: CHEMISTRY

<u>CLASS 10</u>

CHAPTER 1 : CHEMICAL REACTIONS AND EQUATIONS

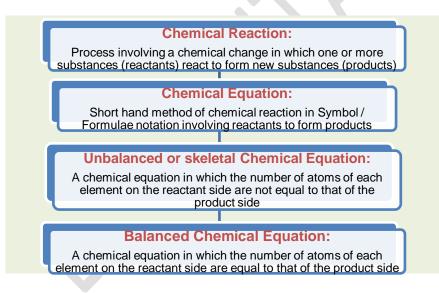
Guidelines

Dear Students

- Refer the content below, view the links, and attempt the assignment provided atthe end in your chemistry notebook
- It would help you to read the NCERT before you begin to answer the questions.
- Link of the chapter is as follows: <u>http://ncert.nic.in/textbook/textbook.htm?jesc1=1-16</u>

SUB TOPICS:

- 1. Recapitulation
- 2. Balancing of chemical equations
- 3. How to make a chemical equation more informative
- 4. Limitations of a chemical equation
- 1. Recapitulation



2. Balancing of Chemical Equations



a) Balancing equation by hit and trial method:

Step I: Write the chemical reaction in word form. Step II: Write the unbalanced / skeletal chemical equation in symbol / formulae.

- Step III: Count the number of atoms of all the reactants (LHS) and the atoms of all the products (RHS).
- Step IV: Select the biggest formulae and balance the element with the highest number of atoms, followed by other elements until the atoms of all the elements are equal on both the sides.

Step V: Check the correctness of the balanced equation.

(LHS = RHS)

Example 1:

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

$$C=1$$

$$H=4$$

$$H=4$$

$$C=1$$

$$H=4$$

$$O=4$$

$$O=4$$

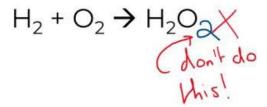
Example 2:



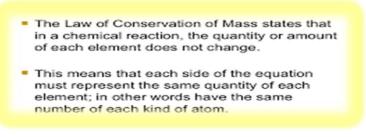
Example 3:

$2 \operatorname{NaOH} + \operatorname{H}_2 \operatorname{SO}_4 \rightarrow \operatorname{Na}_2 \operatorname{SO}_4 + 2 \operatorname{H}_2 \operatorname{O}_4$			
	Element	Before	After
	Na	2	2
	0	6	6
	н	4	4
	s	1	1

Remember not to change the formula of the product / reactant by putting a subscript:







Link: https://www.youtube.com/watch?v=Qci7hiBy7EQ

3. How to Make a Chemical Equation More Informative

To make a chemical equation more informative, the following information can be added:

- a) **Physical state** of reactants and products
 - For solids, the symbol is "(s)".
 - For liquids, it is "(I)".
 - For gases, it is "(g)".
 - For aqueous solutions, it is "(aq)". $Zn(s) + dil. H_2SO_4(aq) o ZnSO_4(aq) + H_2(\uparrow)$
 - (Reactants) (Products)
 - For gas produced in the reaction, it is represented by "(↑)".
 - For precipitate formed in the reaction, it is represented by "(\downarrow)".

$$\mathbf{Eg}: \mathbf{AgNO}_{3(\mathrm{aq})} + \mathbf{NaCl}_{(\mathrm{aq})} \longrightarrow \mathbf{AgCl}_{(\mathrm{s})} \downarrow + \mathbf{NaNO}_{3(\mathrm{aq})}$$

b) Heat changes accompanying the chemical reactions (exothermic or endothermic)

Eg: 1) $C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)} + Q$ (exothermic reaction) 2) $N_{2(g)} + O_{2(g)} \longrightarrow 2 NO_{(g)} - Q$ (endothermic reaction)

c) Conditions under which reactions take place like temperature/ pressure/ catalyst

4. Limitations of a Chemical Equation

• A chemical equation cannot convey the rate or speed of a chemical reaction, which means how fast or slow the reaction is.

ASSIGNMENT

Q 1) Write balanced chemical equations for the following word equations:

A. Calcium hydroxide + Carbon dioxide \rightarrow Calcium carbonate + Water

Skeletal equation: _____

Balanced equation: _____

B. Zinc + Silver nitrate \rightarrow Zinc nitrate + Silver

Skeletal equation: _____

Balanced equation:

C. Aluminium + Copper chloride \rightarrow Aluminium chloride + Copper

Skeletal equation: _____

Balanced equation: _____

D. Potassium bromide(aq)+Barium iodide(aq) \rightarrow Potassium iodide(aq)+Barium bromide(s)

Skeletal equation: _____

Balanced equation: _____

E. Zinc carbonate(s) ---- \rightarrow Zinc oxide(s) + Carbon dioxide(g)

Skeletal equation: _____

Balanced equation: _____

Q 2) The given equation represents the reaction of Sodium metal with water:

Sodium + Water → Sodium hydroxide + Hydrogen

Which of the following chemical equations represent a complete balanced chemical equation for the given word equation?

A. $2Na(s) + H2O \rightarrow 2NaOH(aq) + H2(g)$

B. Na(s) + 2H2O- \rightarrow NaOH(aq) +2H2(g)

C. $2Na(s) + 2H3O \rightarrow 2NaOH(aq) + 2H2(g)$

D. $2Na(s) + 2H2O \rightarrow 2NaOH(aq) + H2(g)$

Q 3) Write a chemical equation (along with state symbols) which represents a complete balanced equation for the reactions:

- a) Barium chloride solution reacts with sodium sulphate solution to produce a precipitate of barium sulphate and sodium chloride solution.
- b) Magnesium ribbon is burnt in a gas jar containing nitrogen gas to form a white powder of Magnesium nitride.
- c) Solid Ferric oxide is heated with Aluminium metal to form molten iron and Aluminium oxide.

- d) Solid Silver Bromide breaks in the presence of sunlight to form silver metal and liquid bromine.
- e) Solid Zinc sulphide when heated in air forms zinc oxide and sulphur dioxide gas.
- Q 4 a) How is a balanced chemical equation different from an unbalanced equation? b) Why do we need to balance a chemical equation?
- Q 5) Balance each of the following equations:
- (a) Fe + $Cl_2 \rightarrow FeCl_3$

- (b) Fe + $O_2 \rightarrow Fe_2O_3$
- (c) $FeBr_3 + H_2 SO_4 \rightarrow Fe_2 (SO4)_3 + HBr$

(d) $C_2H_4 + O_2 \rightarrow CO_2 + H_2O$

(e) $CaCO_3 + H_3PO_4 \rightarrow Ca_3 (PO_4)_2 + H_2CO_3$