

From the session 2023-24, the textbooks are rationalised under the new National Education Policy 2020. This **Sanjiv Refresher** is completely based on the new rationalised textbook.

Sanjiv Refresher

SCIENCE

Based on Latest NCERT Text Book

For Class-10

Price : ₹ 380/-

Publisher :

 **SANJIV PRAKASHAN** 
Jaipur

- Published by :
Sanjiv Prakashan
Dhamani Market, Chaura Rasta,
Jaipur-302003
email : sanjeevprakashanjaipur@gmail.com
website : www.sanjivprakashan.com

- © Publisher

- Laser Type Setting :
Sanjiv Prakashan (D.T.P. Department),
Jaipur

- Printers :
Aadhunik Book Binder, Jaipur

- ❖ *Every effort has been made to remove the mistakes and omissions in this book. In case of any suggestion or any error found, send an email or post a letter to us at the following address :*
Email : sanjeevprakashanjaipur@gmail.com
PostalAddress : Publication Department
Sanjiv Prakashan,
Dhamani Market, Chaura Rasta,
Jaipur-302003
- ❖ *Your suggestions shall be taken care of in our next edition.*
- ❖ *Though all the precautions have been taken in publishing this book yet for any mistake the author, publisher or printer is not liable. All disputes are subjected to Jaipur Jurisdiction only.*
- ❖ *© Rights are reserved. No part of this publication may be produced in any form, by photocopy, microfilm, xerography, recording or otherwise without the prior written permission of the publisher. Any breach will entail legal action and prosecution without further notice.*

CONTENTS

1. Chemical Reactions and Equations	1
2. Acids, Bases and Salts	24
3. Metals and Non-metals	42
4. Carbon and its Compounds	66
5. Life Processes	95
6. Control and Coordination	125
7. How Do Organisms Reproduce?	147
8. Heredity	171
9. Light – Reflection and Refraction	186
10. The Human Eye and the Colourful World	218
11. Electricity	234
12. Magnetic Effects of Electric Current	263
13. Our Environment	278

ये हम नहीं कहते,

जमाना कहता है

संजीव पास बुक्स है नं. 1

दैनिक नवज्योति

जयपुर, 6 जुलाई, 2022

राजस्थान का
प्रमुख दैनिक

विद्यार्थियों में सर्वाधिक लोकप्रिय संजीव पास बुक्स

जयपुर। लम्बे समय से संजीव पास बुक्स अपनी उच्च गुणवत्तायुक्त पाठ्यसामग्री, नवीनतम घटनाक्रम, प्रमाणित आँकड़ों तथा सरल भाषा के कारण विद्यार्थियों में सर्वाधिक लोकप्रिय बनी हुई है। लाखों विद्यार्थी संजीव पास बुक्स से अध्ययन कर सफलता अर्जित कर रहे हैं। उल्लेखनीय है कि स्कूल स्तर के विद्यार्थियों के लिए कक्षा 3 से 9 के लिए संजीव आल इन वन, कक्षा 9 से 12 के लिए अलग-अलग विषय पर संजीव पास बुक्स, अंग्रेजी माध्यम के विद्यार्थियों के लिए कक्षा 5 से 8 के लिए संजीव रिफ्रेशर आल इन वन, कक्षा 9 से 12 के लिए अलग-अलग विषय पर संजीव रिफ्रेशर प्रकाशित की जाती हैं। इनके अलावा अंग्रेजी विषय को आसानी से समझने के लिए कक्षा 6 से 12 के लिए संजीव इंग्लिश कोर्स तथा विज्ञान के विद्यार्थियों की सुविधा के लिए कक्षा 11 एवं 12 के लिए उच्चस्तरीय संजीव साइंस की पाठ्यपुस्तकें भी प्रकाशित की जाती हैं। कॉलेज स्तर पर भी राजस्थान के सभी प्रमुख विश्वविद्यालयों यथा—राजस्थान, भरतपुर, अलवर, सीकर, अजमेर, बीकानेर, कोटा एवं जोधपुर विश्वविद्यालयों के पाठ्यक्रमानुसार प्रथम वर्ष से एम.ए. तक के लिए संजीव पास बुक्स प्रकाशित की जाती हैं। संजीव पास बुक्स की लोकप्रियता के बारे में विद्यार्थियों से बात करने पर उन्होंने बताया कि इसमें उन्हें सरल भाषा में पूरा पाठ्यक्रम, पर्याप्त संख्या में प्रश्न-उत्तर, प्रमाणित आँकड़े, नवीनतम जानकारी उचित मूल्य पर उपलब्ध हो जाती है। इसीलिये सभी विद्यार्थी सहायक पुस्तकों के रूप में संजीव पास बुक्स को ही खरीदना पसन्द करते हैं। संजीव प्रकाशन के निदेशक प्रदीप मित्तल एवं मनोज मित्तल के अनुसार संजीव पास बुक्स सहित अन्य सभी पुस्तकें पूर्णतः नवीनतम पाठ्यपुस्तकों एवं नवीनतम पाठ्यक्रमानुसार तैयार कराई जाती हैं। प्रत्येक विषय की पुस्तक को योग्य तथा अनुभवी विशेषज्ञ प्राध्यापकों से लिखवाया जाता है। इन्हें समय-समय पर पूर्णतः संशोधित तथा अपडेट भी कराया जाता है। इससे सहायक पुस्तकों के रूप में विद्यार्थियों के लिए ये बहुत उपयोगी हो जाती हैं। इन्हीं कारणों से संजीव प्रकाशन द्वारा प्रकाशित संजीव पास बुक्स, संजीव इंग्लिश कोर्स, संजीव साइंस पाठ्यपुस्तकें, संजीव रिफ्रेशर आदि पुस्तकें कक्षा 3 से एम.ए. तक के विद्यार्थियों में अत्यन्त लोकप्रिय हैं।

संजीव पास बुक्स कक्षा 3 से एम. ए. के लिए

प्रकाशक—संजीव प्रकाशन, जयपुर-3

SCIENCE CLASS-X

CHAPTER

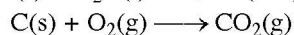
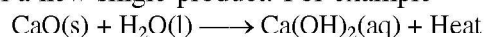
1

CHEMICAL REACTIONS AND EQUATIONS

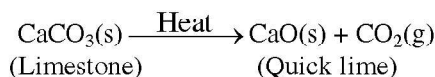
Summary

- (1) **Chemical Reaction**—When a substance reacts with itself or any other substance to form a substance with one or more new chemical properties, then this is called a chemical reaction. The substances which participate in chemical reaction are called reactants and the new substances obtained after chemical reaction are called products.
- (2) (A) **Word-Equation**—
Writing the description of a chemical reaction in words is called word-equation. It is the simplest way to write a chemical reaction, like
- (i) When a magnesium ribbon is burnt in oxygen, it gets converted to magnesium oxide.
Magnesium + Oxygen \longrightarrow Magnesium Oxide [Word equation]
(Reactants) (Product)
- A word equation shows change of reactants to products through an arrow placed between them. The reactants are written on the left-hand side (LHS) with a plus sign (+) between them. Similarly, products are written on the right-hand side (RHS) with a plus sign (+) between them. The arrowhead points towards the products, and shows the direction of the reaction.
- Reactants \longrightarrow Products
(LHS) (RHS)
- (B) **Chemical Equation**—Representation of a chemical reaction by the use of symbols and chemical formulae of reactants and products is called chemical reaction. For example—
- $$2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$$
- (3) **Balanced Chemical Reaction**—Number of all the atoms remains equal in the reactants and products of a balanced chemical equation. The chemical reaction must always be balanced which is done by hit or trial method.
- (4) A complete chemical equation represents the reactants, products and their physical states symbolically. Sometimes, the reaction conditions, such as temperature, pressure, catalyst, etc. for the reaction are indicated above and/or below the arrow in the equation.
- (5) The gaseous, liquid, aqueous and solid states of reactants and products are represented by notations (g), (l), (aq) and (s), respectively.
- (6) **Following observations may occur during a Chemical Reaction**—
- (a) Change in state (b) Change in colour
(c) Evolution of a gas
(d) Change in temperature.
- (7) **Types of Chemical Reactions**—Generally chemical reactions are of following type—

- (i) **Combination reaction**—In a combination reaction two or more reactants combine to form a new single product. For example—



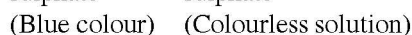
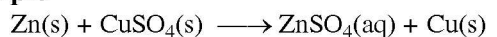
- (ii) **Decomposition reaction**—The reaction in which a single reactant decomposes to give two or more products is called decomposition reaction. For example—



Decomposition reactions require energy either in the form of heat, light or electricity for breaking down the reactants.

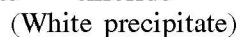
- (iii) **Displacement reaction**—The reaction in which a more reactive element displaces a less reactive element from its compound is called displacement reaction.

Example—



- (iv) **Double displacement reaction**—The reaction in which there is an exchange of ions between the reactants, it is called double displacement reaction.

Example—



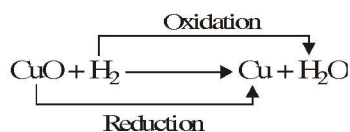
- (v) **Oxidation and Reduction**—In a reaction gain of oxygen or loss of hydrogen is called oxidation. The process of reduction is opposite to oxidation in which loss of oxygen or gain of hydrogen occurs.

Example—



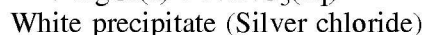
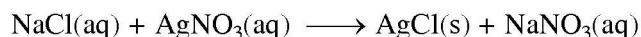
- (vi) **Redox reaction**—The chemical reactions in which oxidation and reduction reactions occur simultaneously are called redox reactions.

Example—



- (vii) **Precipitation reaction**—The reactions in which a insoluble product (precipitate) is formed are called precipitation reactions.

Example—



- (8) **On the basis of heat**, reactions are classified in two parts.

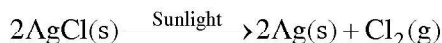
- (a) **Exothermic reaction**—Reactions in which heat is given out along with the products are called exothermic reactions. This makes the reaction mixture warm.

Example— $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g}) + \text{Energy}$

In exothermic reactions, after the products, energy word is written with a plus sign. Most of the combination reactions are of exothermic nature.

- (b) **Endothermic reaction—**Reactions in which energy is absorbed are known as endothermic reactions. This decreases the temperature of the reaction mixture.

Example—



In endothermic reactions, the word sunlight or heat or electric energy is written after the product with a minus sign or above the arrow.

- (9) **Corrosion—**When a metal comes in contact with acid, base or moisture then it will corrode. This process is called corrosion.

Example : (i) Rusting of iron (brown layer), (ii) Black coating on silver, (iii) Green coating on copper.

Methods to prevent corrosion :

- By applying a thin layer of paint, varnish on the surface of metal.
- By applying grease or oil on the parts of machines.
- By using metals that do not corrode, like stainless steel or aluminium.
- By galvanisation
- By chrome plating
- By anodising or making alloys.

- (10) **Rancidity—**When fats and oils are left for a long time in the presence of oxygen then taste and odour of these have changed due to oxidation. This is called rancidity.

Methods to prevent rancidity :

- By adding antioxidants to foods containing fats and oil.
- By keeping foods in airtight containers.
- Packaging foods in nitrogen gas.
- Keeping food in refrigerator.

In-text Questions

Page 6

Q. 1. Why should a magnesium ribbon be cleaned before burning in air?

Ans. Magnesium ribbon is cleaned with sand paper before burning in air because combustion of it is not easy due to layer of metal oxides on metal and impurities present on it. The surface of it becomes rough due to cleaning with sand paper so rate of reaction increases and pure magnesium is obtained.

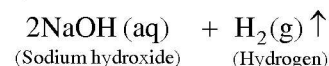
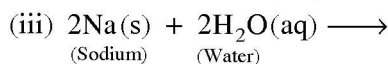
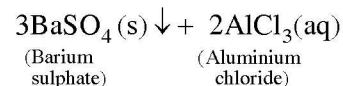
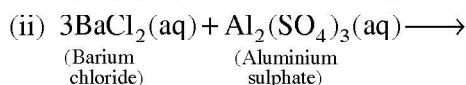
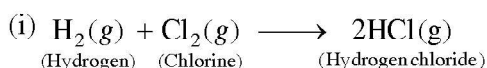
Q. 2. Write the balanced equation for the following chemical reactions—

(i) Hydrogen + Chlorine \rightarrow Hydrogen chloride

(ii) Barium chloride + Aluminium sulphate \rightarrow Barium sulphate + Aluminium chloride

(iii) Sodium + Water \rightarrow Sodium hydroxide + Hydrogen.

Ans.



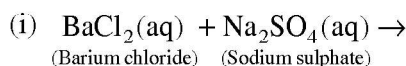
Q. 3. Write a balanced chemical equation with state symbols for the following reactions—

- (i) Solutions of barium chloride and

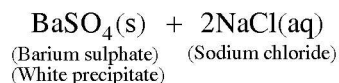
sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.

(ii) Sodium hydroxide solution (in water) reacts with hydrochloric acid solution (in water) to produce sodium chloride solution and water.

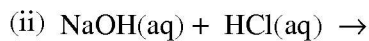
Ans.



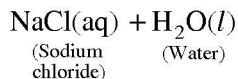
(Barium chloride) (Sodium sulphate)



(Barium sulphate) (Sodium chloride)
(White precipitate)



(Sodium hydroxide) (Hydrochloric acid)



(Sodium chloride) (Water)

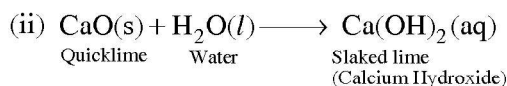
Page 10

Q. 1. A solution of substance 'X' is used for whitewashing.

(i) Name the substance 'X' and write its formula.

(ii) Write the reaction of the substance 'X' named in (i) above, with water.

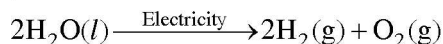
Ans. (i) The substance 'X' used for whitewashing is quicklime (calcium oxide), the chemical formulae of this is CaO.



Quicklime Water Slaked lime
(Calcium Hydroxide)

Q. 2. Why is the amount of gas collected in one of the test tubes in Activity 1.7 (See in text book) double of the amount collected in the other? Name this gas.

Ans. In activity 1.7 the reaction of electrolysis of water occurs as follows :



On completion of reaction hydrogen and oxygen are obtained at cathode and anode in the ratio of 2 : 1 by volume.

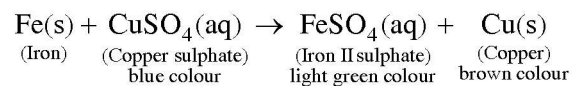
According to law of mass action, when two molecules of water (H₂O) are decomposed then amount of Hydrogen produced in double than amount of oxygen. So in the above

activity amount of gas (Hydrogen) collected in one of the test tubes is double of the amount collected in the other.

Page 13

Q. 1. Why does the colour of copper sulphate solution change when an iron nail is dipped in it?

Ans. When an iron nail is dipped in blue coloured copper sulphate solution then the reaction given below takes place. In this reaction more reactive iron displaces less reactive copper from copper sulphate solution.

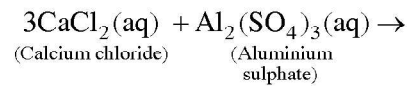


(Iron) (Copper sulphate) (Iron II sulphate) (Copper)
blue colour light green colour brown colour

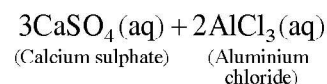
In this, the blue colour of copper of copper sulphate solution fades and Iron nails becomes brown.

Q. 2. Give an example of a double displacement reaction other than the one given in activity 1.10 (See in textbook).

Ans. Double displacement reaction—
The reaction in which there is an exchange of ions between the two different reactants are called double displacement reaction.

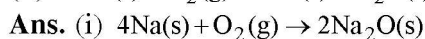
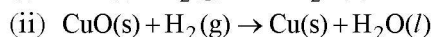
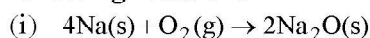


(Calcium chloride) (Aluminium sulphate)

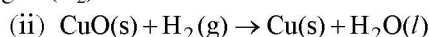


(Calcium sulphate) (Aluminium chloride)

Q. 3. Identify the substances that are oxidised and substances that are reduced in the following reactions—



In this reaction sodium (Na) is oxidised and oxygen (O₂) is reduced.



In this reaction CuO is reduced and H₂ is oxidised.

Textbook Questions

Q. 1. Which of the statements about the reaction below are incorrect?