

India's Number 1 Education App

CHEMISTRY

BOOKS - TARGET PUBLICATION

METALLURGY

Choose The Correct Altervative

1. Metal tungsten has the highest melting

point____.

A. Gold

B. Tungsten

C. Platinum

D. Iron

Answer: B

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2. The soft metal which can be cut with knife is

A. sodium

- B. aluminium
- C. copper
- D. silver

Answer: A



3._____is the hardest natural subtance.

A. diamond

B. aluminium

C. graphite

D. silver

Answer: A

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4. What is the colour of the flame when copper

metal is burned on the flame?

A. Orangish red

B. Bluish green

C. Yellow

D. Brown

Answer: B

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5. An element A is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following.

A. Mg

B. Na

C. Al

D. Ca

Answer: B



6. What will you observe when calcium is treated with water?

A. It reacts violently with water.

B. It reacts slowly to form calcium oxide.

C. Bubbles of hydrogen gas are formed

which stick to the surface of calcium

D. It does not react with water.

Answer: C



7. Which of the following metals, does not react with cold or hot water but reacts with steam?

A. Potassium

B. Calcium

C. Magnesium

D. Iron

Answer: D

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8. The CORRECT increasing order of reactivity of metals is ___

A. Mg < Al < Zn < Fe

B. Al < Zn < Fe < Mg

C. Fe < Zn < Al < Mg

D. Zn < Mg < Fe < Al

Answer: C



9. Priyanka introduced an iron nail in a testtube containing freshly prepared copper sulphate solution. What would she observe?

A. The blue colour of the solution changed

to green

B. The green colour of the solution changed to blue.

C. The solution becomes colourless

D. The colour of the solution did not

change

Answer: A



10. When a copper strip is kept immersed in freshly prepared ferrous sulphate solution taken in test-tube, ____

A. the blue colour of the solution change

green

B. the green colour of the solution change

to blue

C. the solution becomes colourless

D. the colour of the solution does not

change

Answer: D

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11. In which of the following pairs will the displacement reaction occur?

A. $ZnSO_4$ solution and copper metal

B. $FeSO_4$ solution and silver metal

C. $FeSO_4$ solution and copper metal

D. $CuSO_4$ solution and iron metal

Answer: D

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12. When an aluminium strip is immersed into $ZnSO_4$ solution, the colour of the solution

A. remains the same

B. turns light green

C. turns light blue

D. turns yellow

Answer: A

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13. Iron is _____

A. more reactive than zinc

B. more reactive than aluminium

C. less reactive than copper

D. less reactive than aluminium

Answer: D

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14. Which of the following is an ionic compound ?

A. H_2O

 $\mathsf{B.}\,MgCl_2$

C. MgO

D. NaBr

Answer: A

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15. Give scientific reasons:

Aluminium oxide is called an amphoteric oxide

A. acidic

B. basic

C. amphoteric

D. neutral

Answer: C

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16. The greenish layer formed over the surface

of copper vessels is of _____

A. copper carbonate

B. copper sulphide

C. copper oxide

D. copper chloride

Answer: A

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17. When a corroded copper article is dipped in

silver nitrate solution, ____

A. nitrate gets deposited on the article

B. silver gets deposited on the article

C. there is no change

D. the corrosion on the article increases

Answer: B

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Complete The Paragraph

1. Select the appropriate options and complete

the following paragraph.

(ores, gangue, metallurgy, free, electrolysis, minerals, combined, copper, iron, platinum) Based on their reactivity, most of the metals are found in ___ state in the earth's crust while some metals such as silver, gold and are found in free state. The compounds of metals which occur naturally in the earth's crust are known as . The minerals from which metals can be profitably extracted are called _____. Ores mined from earth usually contain large amount of impurities like sand , soil , etc. These impurities are called ___ . The extraction of metals from

their ores and then refining them for use is

known as ____



Name The Following

1. The nonmetal which exists as liquid under

normal condition

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2. The nonmetal which has metallic luster



5. The oxide that froms salt and water by reacting with both acid and base



6. The reagent that dissolves noble metals.



7. The device used for grinding an ore.

Γ



9. Write the chemical formula of cryolite



10. Alloy of sodium with mercury.



Nonmetals attain stable noble gas
configuration by losing electrons
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3. Cassiterite mainly contains the nonmagnetic ingredient, $FeWO_4$ and the magnetic ingredient, SnO_2 .

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4. Magnetic separation method is used to

concentration zinc blende ore

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5. In Bayer's process, bauxite ore is leached by

aqueous sodium carbonate solution

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6. A greenish layer is formed on silver articles due to reaction of silver with hydrogen sulphide in air.



7. Ornaments are plated with gold using anodizing process.

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1. Find the odd one out:

Sodium, mercury, lead, chlorine

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2. Find the odd one out:

Nitrogen, oxygen, fluorine, helium

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3. Find the odd one out:

Calcium oxide, magnesium oxide, lithium

oxide, zinc oxide



4. Find the odd one out:

Tinning, anodization, alloying, froth floatation



5. Find the odd one out:

Chromium, copper, stainless steel, iron



Complete The Analogy

1. Zinc blende : ZnS :: Copper pyrite : ___

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3. Concentration of carbonate ores :

Calcination :: Concentration of sulphide ores :

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4. A metal is coated with its oxide : Anodizing :: A less reactive metal is coated on a more reactive metal : _____



5. Stainless steel : Iron, chromium and carbon

:: Bronze : _____

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Match The Following

1. Match the following

	Column I		Column II
i.	Fluorspar	a.	SiO ₂
ii.	Silica	b.	Na ₃ AlF ₆
iii.		с.	CaF ₂

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Answer The Following

1. Give examples of any two metals which exist

as liquid under the normal condition





2. Explain the following:

What are the properties of metals and Non-

metals?

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3. Explain the terms malleable and ductile with

examples.

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4. Name the allotropes of carbon .



5. Out of sodium and sulphur which Is a metal?

Explain its reaction with the oxygen.

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6. Name two metals which react violently with cold water. Write any four observations you
would make when such a metal is dropped into water.



8. Are all the metals equally reactive?

9. What is aqua regia? How is it prepared?

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10. Arrange the following metals in the order of their decreasing reactivity: Aluminium, gold,

sodium, copper

11. Divide the metals Cu, Zn, Ca, Mg, Fe, Na, Li into three groups, namely reactive metals, moderately reactive metals and less reactive metals.

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12. Which metal is more reactive, copper or

iron?

13. Name one metal which can displace hydrogen from dilute acids and one metal which cannot.

14. What will you observe when zinc granules are added to ferrous sulphate solution? Write the chemical reaction involved.

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15. A solution of ferrous sulphate was kept in an aluminium can. After few days, the can was found to have a number of holes in it. Explain the observation and write the chemical equation involved.

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16. Explain the following:

When a copper coin is dipped in silver nitrate solution, a glitter appears on the coin after

some time, Why does this happen? Write the

chemical equation.



18. Explain the following:

The electronic configuration of metal A is 2,8,1

and that of metal B is 2,8,2. Which of the two metals is more reactive? Write their reaction with dilute hydrochloric acid.

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19. A nonmetal 'X' is an important constituent of all living organisms and it forms two oxides Y and Z which are gases. Y is toxic while Z is responsible for global warming. Identify X, Y and Z. **20.** In the reaction between chlorine and HBr transformation of HBr into Br_2 takes place. Can this transformation be called oxidation? Which is the oxidant that brings about this oxidation?



21. State two important factors responsible for

a certain crystal structure in ionic compounds





23. Why are ionic compounds solid and hard at

room temperature?

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24. Give examples of any two metals which are

generally found in the free state in nature.



25. Aluminium occurs in combined state whereas gold is found in free state in nature. Why?

26. Explain the terms :

Metallurgy

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27. Explain the terms :

Ores

28. Explain the terms :

Minerals

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29. Explain the terms :

Gangue



30. Write a short note on concentration of

ores.

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31. Label the diagram given below and explain

it



32. Explain hydraulic separation method with

neat and labelled diagram

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33. A tapping vessel opens in a tank like container that is tapering on the lower side. The tank has an outlet for water on the upper side and a water inlet on the lower side. Finely ground ore is released in the tank. A forceful jet of water is introduced in the tank from lower side and gangue particles and pure ore are separated by this method.

i. The above description is of which gravitation separation method?

ii. Draw labelled diagram of this method.



34. Describe magnetic separation method with the help of labelled diagram. Also explain how

cassiterite ore is concentrated by this method.



35. With neat and labelled diagram, explain

froth floatation method.

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36. What is the difference between magnetic separation method and froth floatation method?



37. Write a short note on leaching.



38. Name the chemical process used for obtaining a metal from its oxide.
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39. Answer the following in one or two sentences

What is the electronic definition of oxidation

and reduction?

40. Write a short note on: Extraction of highly

reactive metals.



41. Give four examples of highly reactive metals.

42. Write the electrode reaction for electrolysis of molten magnesium chloride and calcium chloride



43. Describe Bayer's process for concentration

of bauxite ore.





alumina with neat labelled diagram



46. Complete the following statement using every given options.

During the extraction of aluminium____

Ingredients and gangue in bauxite

A. Ingredients of gangue and bauxite.

B. Use of leaching during the

concentration of ore.

C. Chemical reaction of transformation of

bauxite into alumina by Hall's process.



concentrated caustic soda.

Answer:

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47. Answer the following in one or two

sentences

What are the moderately reactive metals?

48. Answer the following in one or two sentences

In which form do the moderately reactive

metals occur in nature?

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49. Give scientific reasons:

Carbonate and suphide ores are usualy converted into oxides during the process of extraction



50. Mention the steps carried out for the extraction of zinc from its carbonate ore. Write the chemical reactions involved.

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51. Distinguish between

Calcination and roasting.

52. Give any four examples of moderately reactive metals.
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53. $3MnO_2 + 4Al ightarrow 3Mn + 2Al_2O_3$ + Heat

Identify the substances undergone oxidation



54. Explain thermit reaction and give its uses.



55. Explain the steps involved in the extraction

of copper from its sulphide ore. Write the

balanced equations involved.



56. Draw a concept map to show the steps to

extract metals of medium and low reactivity

from their sulphide ores



57. State the difference between highly reactive metals and less reactive metals.



58. Give two examples of less reactive metals





below.



65. In two methods of control of corrosion of aluminium, either a layer of aluminium oxide is formed or a silver plating is done on the surface. State to which electrode the aluminium article is attached in these methods respectively

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66. What is an alloy ? Give two examples of

alloys



67. Alloys are prepared by mixing a metal with other metals or nonmetals in certain proportion. The properties of the main metal change when the metal is alloyed.
i. How do the properties of iron change when carbon and chromium are mixed with it?

ii. How do the properties of copper change

when tin is mixed with it?

68. Give examples of alloys containing mercury.



Give Reasons

 Electric wires are covered with rubber like material.
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2. Give scientific reasons:

Metals are good conductors of electricity while non-metlas are bad conductors of electricity.

3. Give scientific reasons:

Sodium is always kept in kerosene



4. Calcium floats over water during its reaction

with water.
5. Metals like copper fail to evolve hydrogen

gas on reacting with dilute nitric acid.

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6. Generally the ionic compounds have high

melting points

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7. NaCl is not a conductor of electricity in solid

state whereas it does conduct electricity in

aqueous solution as well as in molten state.



8. Pine oil is used in froth floatation.



9. Anodes need do be replaced from time to

time during the electrolysis of alumina



10. The shining surface of some metals becomes dull when exposed to air for a long time.

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11. Give scientific reasons:

Lemon or tamarind is used for cleaning copper

vessels turned greenish

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Give Balanced Chemical Equation

1. Sodium oxide dissolves in water.

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2. Steam is passed over aluminium.



5. Zinc is treated with dilute hydrochloric acid.



7. Give balanced chemical equations for the following chemical reaction.





8. Give balanced chemical equations for the following chemical reaction.

Chlorine reacts with dilute hydrobromic acid.

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9. Write chemical equation for the following

events:

Aluminium comes in contact with air.



10. Write chemical equation for the following events:

Iron filings are dropped in aqueous solution of

copper sulphate



11. Write chemical equation for the following events:

A reaction was brought about between ferric

oxide and aluminium

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12. Write chemical equation for the following

events:

Electrolysis of alumina is done.

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13. Write chemical equation for the following events:

Zinc oxide is dissolved in dilute hydrochloric acid

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Distinguish Between

1. Distinguish between

Metals and non_metals (based on chemical



2. Distinguish between

Calcination and roasting.

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Complete The Given Chart Table

1. Complete the following table using a mark 'right' if the reaction occurs and 'wrong' for no reaction.

Metal	Ferrous sulphate	Copper sulphate	Zinc sulphate	Silver nitrate
Cu				
Ag				
Al				
Pb				



2. You are given an ore which is either carbonate or sulphide ore of a metal which lies in the middle of the reactivity series.

Complete the following flow chart with 'Yes' or

'No'



Question Based On Diagram

1. Study the following experimental set-up and

answer the following questions.



What changes will you observe in test tube A?



2. Study the following experimental set-up and

answer the following questions.



What do you think will happen in test tube B?



3. Study the following experimental set-up and

answer the following questions.



What will happen if copper sulphate solution in test tube A is replaced by magnesium nitrate solution?

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4. In the given reactivity series, some metals are misplaced. Rearrange these metals in the

decreasing order of their reactivity.



5. Draw a neat and labelled diagram

Magnetic separation method

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6. Draw a neat and labelled diagram

Froth floatation method

Watch Video Solution

7. Draw a neat and labelled diagram

Electrolytic reduction of alumina

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8. Draw a neat and labelled diagram

Hydraulic separation

Watch Video Solution

9. Identify the process represented by the following diagram. Describe the process in short.

10. Study the diagram and answer the following questions

What does the diagram represent?

11. Study the diagram and answer the following questions

Write the reactions occurring at cathode and

anode.

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Question Based On Paragraph

1. Manish was given aqueous solutions of silver nitrate, zinc sulphate and an iron nail. In the first experiment, he dipped iron nail in silver nitrate solution and observed that the solution turned brown. In second experiment, he dipped iron nail in zinc sulphate solution. However, no change was observed. Based on the above information, answer the following questions. Why did solution turn brown in the first experiment?

2. Manish was given aqueous solutions of silver nitrate, zinc sulphate and an iron nail. In the first experiment, he dipped iron nail in silver nitrate solution and observed that the solution turned brown. In second experiment, he dipped iron nail in zinc sulphate solution. However, no change was observed. Based on the above information, answer the following questions. Name the type of reaction that occurs when

iron reacts with $AgNO_3$ solution.

3. Manish was given aqueous solutions of silver nitrate, zinc sulphate and an iron nail. In the first experiment, he dipped iron nail in silver nitrate solution and observed that the solution turned brown. In second experiment, he dipped iron nail in zinc sulphate solution. However, no change was observed. Based on the above information, answer the following questions.

If he adds zinc strip in ferrous sulphate solution, what colour change will he observe?

4. Manish was given aqueous solutions of silver nitrate, zinc sulphate and an iron nail. In the first experiment, he dipped iron nail in silver nitrate solution and observed that the solution turned brown. In second experiment, he dipped iron nail in zinc sulphate solution. However, no change was observed.

Based on the above information, answer the

following questions.

Will silver react with zinc sulphate solution?

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5. Manish was given aqueous solutions of silver nitrate, zinc sulphate and an iron nail. In the first experiment, he dipped iron nail in silver nitrate solution and observed that the solution turned brown. In second experiment, he dipped iron nail in zinc sulphate solution.

However, no change was observed.

Based on the above information, answer the

following questions.

Based on your observation, arrange Ag, Zn and

Fe in decreasing order of their reactivity.

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Apply Your Knowledge

1. Which method do we use when we want to study many things together and at the same

 Apparatus: Pairs of tongs or spatula, knife, burner, etc.

Chemicals: Samples of aluminium, copper, iron, lead, magnesium, zinc and sodium. Procedure: Hold the sample of each of the above metals at the top of the flame of a burner with the help of a pair of tongs, or a spatula

Which metal catches fire readily?

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3. Apparatus: Pairs of tongs or spatula, knife, burner, etc.

Chemicals: Samples of aluminium, copper, iron,

lead, magnesium, zinc and sodium.

Procedure: Hold the sample of each of the

above metals at the top of the flame of a

burner with the help of a pair of tongs, or a

spatula

How does the surface of a metal appear on

catching fire?

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4. Apparatus: Pairs of tongs or spatula, knife, burner, etc.
Chemicals: Samples of aluminium, copper, iron, lead, magnesium, zinc and sodium.
Procedure: Hold the sample of each of the

above metals at the top of the flame of a

burner with the help of a pair of tongs, or a

spatula

Combustion of metal

What is the colour of the flame while the metal is burning on the flame?

5. Apparatus: Beakers.

Chemicals: Samples of various metals, water.

Procedure: Drop a piece of each of the metal

in separate beakers filled with cold water.

Which metal reacts with water?

6. Apparatus: Beakers.

Chemicals: Samples of various metals, water.

Procedure: Drop a piece of each of the metal

in separate beakers filled with cold water.

Which metal floats on water? Why?

7. Apparatus: Beakers.

Chemicals: Samples of various metals, water.

Procedure: Drop a piece of each of the metal

in separate beakers filled with cold water.

Prepare a table with reference to the above

procedure and note your observations in it.

8. Test whether the metals gold, silver and copper react with water and think over the finding.

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9. A man went door to door posing as a goldsmith. He promised to bring back the glitter of old and dull gold ornaments. An unsuspecting lady gave a set of gold bangles to him which he dipped in a particular
solution which was a fuming liquid. The bangles sparkled like new but their weight was reduced drastically. The lady was upset but after a futile argument the man beat a hasty retreat. Can you play the detective to find out the nature of the solution he had used?



10. Apparatus: Copper wire, iron nail, beaker or

big test tube, etc.

Chemicals: Aqueous solutions of ferrous

sulphate and copper sulphate.

Procedure: i. Take a clean copper wire and a clean iron nail.

ii. Dip the copper wire in ferrous sulphate solution and the iron nail in copper sulphate solution.

iii . Keep on observing continually at a fixed interval of time.

In which test tube a reaction has taken place?



11. Apparatus: Copper wire, iron nail, beaker or big test tube, etc. Chemicals: Aqueous solutions of ferrous sulphate and copper sulphate. Procedure: i. Take a clean copper wire and a clean iron nail. ii. Dip the copper wire in ferrous sulphate solution and the iron nail in copper sulphate solution.

iii . Keep on observing continually at a fixed interval of time.

How did you recognize that a reaction has

taken place?



12. Apparatus: Copper wire, iron nail, beaker or

big test tube, etc.

Chemicals: Aqueous solutions of ferrous sulphate and copper sulphate.

Procedure: i. Take a clean copper wire and a clean iron nail.

ii. Dip the copper wire in ferrous sulphate

solution and the iron nail in copper sulphate solution.

iii . Keep on observing continually at a fixed

interval of time.

What is the type of the reaction?

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13. Apparatus: Metal spatula, burner, carbon electrodes, beaker, cell, lamp, press key, electrical wires, etc.

Chemicals: Samples of sodium chloride,

potassium iodide and barium chloride, water. Procedure: Observe the above samples. Place sample of one of the above salts on the spatula and heat it on the flame of the burner. Repeat the procedure using the other salts. As shown in the figure, assemble an electrolytic cell.



Conductivity of salt solution

Assemble an electrolytic cell by using a beaker

and connecting the carbon electrodes to the positive and negative terminal of the cell. Dip the electrodes in solution of any one of the salts. Do you see the lamp glowing? Check this with all the other salts as well.

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14. Collect the information about the different steps of metal extraction and explain it in the class. Collect the related videos

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15. Collect Information. Collect information regarding bar and write is extracted from its ore cinnabar and write the corresponding chemical reaction.

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16. Answer the following in one or two sentences

What is meant by corrosion?

17. Have you seen the following things? Old iron bars of buildings, copper vessels not cleaned for long time, silver ornaments or idols exposed to air for long time, old abandoned vehicles fit to be thrown away.

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18. Explain the following:

Why do silver articles turn balckish while

copper vessels turn greenish on keeping in air

for a long time?



19. Explain the following:

Why do pure gold and platinum always giltter?

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20. Answer the following in one or two sentences

Which measures would you suggest to stop

the corrosion of metallic articles or not to

allow the corrosion to start?

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21. Answer the following in one or two sentences

What is done so to prevent rusting of iron

windows and iron doors of you houseA?

22. Explain the following:

Can we permanently prevent the rusting of an

iron article by applying a layer of paint on its

surface?

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23. What are the various alloys used in daily

life? Where are those used?

24. What are the properties that the alloy used

for minting coins should have?



25. Seema wants to purchase a gold ornament. Gold ornaments are not made of pure gold but they are usually made up of 22 carat. Her cousin Isha asks her to check hallmark while purchasing jewellery. Why does she ask to do

so?

26. Collect metal vessels and various metal articles. Write detailed information. Write the steps in the procedure that can be done in the laboratory for giving glitter to these. Seek guidance from your teacher.



Chapter Assessment

1. A student added zinc strip to a solution of $CuSO_4$. After several minutes, he observed that the blue colour of solution changed and a layer got deposited on zinc strip. The colour of the solution and that of the coating would respectively be

A. green, black

B. colourless, black

C. colourless, reddish brown

D. green, reddish brown

Answer:



2. Aqueous solution of which of the following does NOT conduct electricity?

A. Sodium chloride

B. Silver nitrate

C. Barium chloride

D. Glucose



4. Complete the anology and explain

Gallium : ____ : : Iodine : Solid





5. Match the following reactions given in Group 'A' with the observations of reaction given in Group 'B'

	Group 'A'		Group 'B'
a.	$Zn + H_2SO_4 \longrightarrow$	1.	Solution turns blue.
b.	$Cu + dilute HCl \longrightarrow$	2.	H ₂ gas is evolved.
		3.	No reaction occurs.



6. Anodes need do be replaced from time to time during the electrolysis of alumina





7. What are the constituents of stainless stell

alloy ? Which property of stainless steel makes

it suitable for household utensils ?

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8. Identify acidic and basic oxides from the

following : Na_2O , SO_2 , MgO, CO_2

9. Complete the following reactions :

 $Cl_{2(g)} + H_2O_{(l)} \rightarrow \Box + \Box$

 $Zn_{(s)} + 2HCl_{(aq)} \rightarrow \Box + \Box$

 $CuSO_{4(aq)} + Fe_{(s)} \rightarrow \Box + \Box$

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10. The adjacent figure represents electrolytic reduction of alumina.



What is the function of cryolite and fluorspar

in this process ?

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11. What are alloys ? Explain with suitable examples properties of alloys which make them useful over pure metals .



labelled diagram