

Class 10 Science Chapter 3 Metals and Non-metals

Q- 1 Give an example of a metal which :

- (i) is a liquid at room temperature.
- (ii) can be easily cut with a knife.
- (iii) is the best conductor of heat.
- (iv) is a poor conductor of heat.

Answer:

- (i) Mercury
- (ii) Sodium
- (iii) Silver
- (iv) Lead

Q- 2. Explain the meanings of malleable and ductile.

Answer:

Malleable : A metal that can be beaten into thin sheets on hammering is called malleable.

Ductile : A metal which can be drawn into thin wires is called ductile.

Class 10 Metals and Non Metals NCERT Book Page Number: 46

Q- 1. Why is sodium kept immersed in kerosene oil ?

Answer:

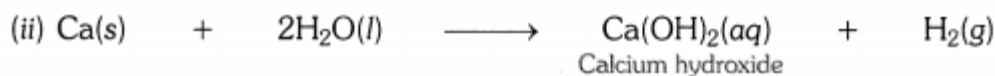
Sodium is highly reactive. So it is kept immersed in kerosene oil to prevent its reaction with oxygen, moisture and carbon dioxide of air to prevent accidental fires.

Q- 2. Write equations for the reactions of

(i) iron with steam.

(ii) calcium and potassium with water.

Answer:



Q- 3. Samples of four metals A, B, C and D were taken and added to the following solution one by one.

The results obtained have been tabulated as follows:

Metal	Iron (II) sulphate	Copper (II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement		
B	Displacement		No reaction	
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the Table above to answer the following Q-s about metals A, B, C and D.

(i) Which is the most reactive metal ?

(ii) What would you observe if B is added to a solution of copper (II) sulphate?

(iii) Arrange the metals A, B, C and D in the order of decreasing reactivity.

Answer:

(i) B is the most reactive metal because it gives displacement reaction with iron (II) sulphate.

(ii) When metal B is added to copper (II) sulphate solution, a displacement reaction will take place due to which the blue colour of copper (II) sulphate solution will fade and a red-brown deposit of copper will be formed on metal B.

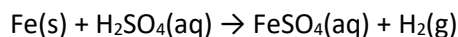
(iii) Metal B is the most reactive because it displaces iron from its salt solution. Metal A is less reactive because it displaces copper from its salt solution. Metal C is still less reactive because it can displace only silver from its salt solution and metal D is the least reactive because it cannot displace any metal from its salt solution. Hence, the decreasing order of reactivity of the metals is $B > A > C > D$.

Q- 4. Which gas is produced when dilute hydrochloric acid is added to a reactive metal ? Write the chemical reaction when iron reacts with dilute H₂SO₄.

Answer:

Hydrogen gas is produced when dilute hydrochloric acid is added to a reactive metal.

Chemical reaction when iron reacts with dilute H₂SO₄ :



Q- 5. What would you observe when zinc is added to a solution of iron (II) sulphate ? Write the chemical reaction that takes place.

Answer:

Zinc is more reactive than iron. Therefore, when zinc is added to a solution of iron (II) sulphate, then the greenish colour of iron (II) sulphate solution fades gradually due to the formation of colourless zinc sulphate solution and iron metal is deposited on zinc.



Class 10 Metals and Non Metals NCERT Book Page Number: 49

Q- 1

(i) Write the electron dot structures for sodium, oxygen and magnesium.

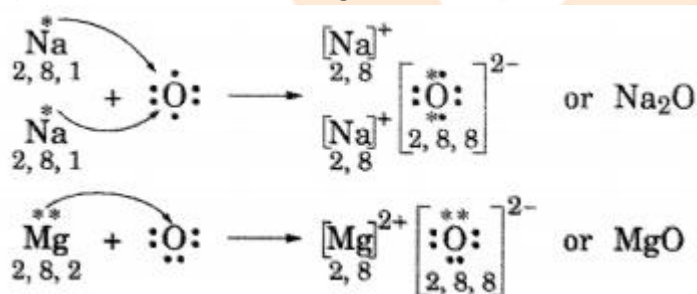
(ii) Show the formation of Na₂O and MgO by the transfer of electrons.

(iii) What are ions present in these compounds?

Answer:

(i) Element	Sodium (Na)	Oxygen (O)	Magnesium (Mg)
Electron dot structure	$\begin{array}{c} \cdot\text{Na} \\ 2, 8, 1 \end{array}$	$\begin{array}{c} \cdot\ddot{\text{O}}\cdot \\ 2, 8, 6 \end{array}$	$\begin{array}{c} \ddot{\text{Mg}} \\ 2, 8, 2 \end{array}$

(ii) Formation of Na₂O and MgO



(iii) In Na₂O, ions present are Na⁺ and O²⁻.

In MgO, ions present are Mg²⁺ and O²⁻.

Q- 2. Why do ionic compounds have high melting points ?

(iii) What are ions present in these compounds?

Answer:

The ionic compounds are made up of positive and negative ions. There is a strong force of attraction

between the oppositely charged ions, so a lot of heat energy is required to break this force of attraction and melt the ionic compound. Due to this, ionic compounds have high melting points.

Class 10 Metals and Non Metals NCERT Book Page Number: 53

Q- 1. Define the following terms : (i) Mineral, (ii) Ore and (iii) Gangue.

Answer:

(i) Mineral : The natural materials in which the metals or their compounds are found in earth are called minerals.

(ii) Ore : Those minerals from which the metals can be extracted conveniently and profitably are called ores.

(iii) Gangue : The unwanted impurities like sand, rocky material, earth particles, lime stone, mica, etc in an ore are called gangue.

Q- 2. Name two metals which are found in nature in the Free State.

Answer:

Gold and platinum

Q- 3. What chemical process is used for obtaining a metal from its oxide.

Answer:

Reduction process is used for obtaining a metal from its oxide.

For example, zinc oxide is reduced to metallic zinc by heating with carbon.



Besides carbon, highly reactive metals like sodium, calcium, aluminium etc. are used as reducing agents. These displace metals of low reactivity from their oxides.

For example,



Gold is Metal or Nonmetal ?

Gold is a metal found in nature in the free state

Class 10 Metals and Non Metals NCERT Book Page Number: 55

Q- 1. Metallic oxides of zinc, magnesium and copper were heated with the following metals :

	Metal	Zinc	Magnesium	Copper
1.	Zinc oxide			
2.	Magnesium oxide			

3.	Copper oxide			
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In which cases will you find displacement reactions taking place ?

Answer:

A more reactive metal can displace a less reactive metal from its oxide. But out of zinc, magnesium, and copper metals, magnesium is the most reactive, zinc is less reactive whereas copper is the least reactive metal.

The displacement will take place in the following cases :

	Metal	Zinc	Magnesium	Copper
1.	Zinc oxide	—	Displacement	—
2.	Magnesium oxide	—	—	—
3.	Copper oxide	Displacement	Displacement	—

Q- 2. Which metals do not corrode easily?

Answer:

Gold and Platinum.

Q- 3. What are alloys?

Answer:

An alloy is a homogeneous mixture of two or more metals, or a metal and a non-metal. For example, bronze is an alloy of copper and tin.

Science Chapter 3 Textbook Chapter End Q-s

Q- 1. Which of the following pairs will give displacement reactions ?

- (a) NaCl solution and copper metal.
- (b) MgCl_2 solution and aluminium metal.
- (c) FeSO_4 solution and silver metal.
- (d) AgNO_3 solution and copper metal.

Answer:

- (d) AgNO_3 solution and copper metal.

Q- 2. Which of the following methods is suitable for preventing an iron frying pan from rusting ?

- (a) Applying grease
- (b) Applying paint.
- (c) Applying a coating of zinc
- (d) All the above.

Answer:

- (c) Applying a coating of zinc.

Q- 3. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be

- (a) calcium
- (b) carbon
- (c) silicon
- (d) iron

Answer:

- (a) Calcium.

Q- 4. Food cans are coated with tin and not with zinc because

- (a) zinc is costlier than tin
- (b) zinc has a higher melting point than tin
- (c) zinc is less reactive than tin
- (d) zinc is more reactive than tin.

Answer:

- (d) Zinc is more reactive than tin.

Metals and Non metals

Q- 5. You are given a hammer, a battery, a bulb, wires and a switch.

- (a) How could you use them to distinguish between samples of metals and non-metals?
- (b) Assess the usefulness of these tests in distinguishing between metals and non-metals.

Answer:

(a) Metals can be beaten into thin sheets with a hammer without breaking. Non-metals cannot be beaten with a hammer to form thin sheets. Non-metals break into pieces when hammered. Metals are malleable, while non-metals are non-malleable. When metals are connected into circuit using a battery, bulb, wires and switch, current passes through the circuit and the bulb glows. When non-metals (like sulphur) are connected, the bulb does not light up at all. Metals are good conductors of electricity.

(b) Because of malleability, metals can be casted into sheets. Metals are good conductors of electricity so these can be used for electrical cables.

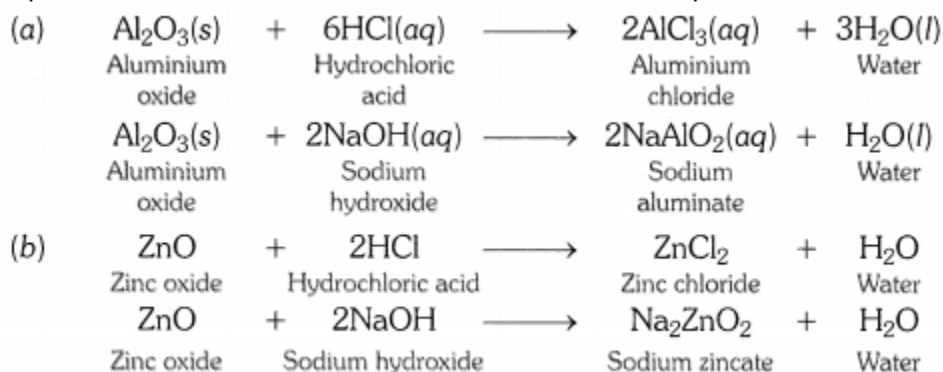
Q- 6. What are amphoteric oxides ? Give two examples of amphoteric oxides ?

OR

Write chemical equations that show aluminium oxide reacts with acid as well as base.

Answer:

Those metal oxides which show basic as well as acidic behaviour are known as amphoteric oxides. In other words, metal oxides that react with both acids and bases to form salt and water are called amphoteric oxides. Aluminium oxide and zinc oxide are amphoteric in nature.



Q- 7. Name two metals which will displace hydrogen from dilute acids and two metals which will not.

Answer:

(i) Metals above hydrogen in the activity series like sodium and magnesium displace hydrogen from dilute acids.

(ii) Metals below hydrogen in the activity series like copper, silver do not displace hydrogen from dilute acids.

Q- 8. In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte ?

Answer:

Cathode – Pure metal

Anode – Impure metal

Electrolyte – Metal salt solution

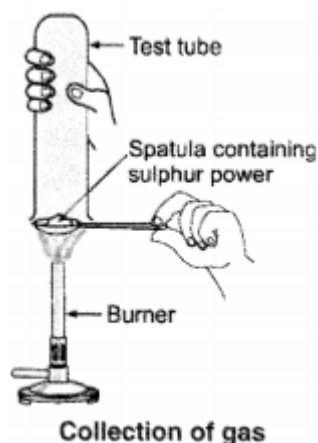
Q- 9. Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test tube over it, as shown in the figure.

(a) What will be the action of gas on

(i) dry litmus paper ?

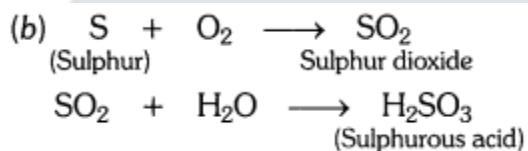
(ii) moist litmus paper ?

(b) Write a balanced chemical equation for the reaction taking place.



Answer:

- (i) Dry litmus paper – no action.
- (ii) Moist litmus paper – becomes red.



Q- 10. State two ways to prevent the rusting of iron.

Answer:

Ways to prevent rusting of iron are :

- (a) By painting
- (b) By galvanizing

Q- 11. What type of oxides are formed when non-metals combine with oxygen ?

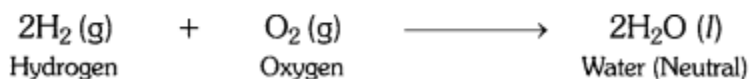
Answer:

Non-metals combine with oxygen to form acidic oxides or neutral oxides.

Acidic oxide as sulphur dioxide



Neutral oxide as water



Q- 12. Give reasons :

- (a) Platinum, gold and silver are used to make jewellery.
- (b) Sodium, potassium and lithium are stored under oil.
- (c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
- (d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.

Answer:

- (a) Platinum, gold and silver are used to make jewellery because these are malleable and ductile. These are highly resistant to corrosion.
- (b) Sodium, potassium and lithium are very reactive and catch fire when exposed to air. This is due

to their low ignition temperature and high reactivity.

(c) Aluminium forms a non-reactive layer of aluminium oxide on its surface. This layer prevents aluminium to react with other substances. That's why aluminium is used to make cooking utensils.

(d) It is easier to reduce a metal oxide into free metal. Since it is easier to obtain metals from their oxides than from their carbonates or sulphides directly, therefore, the carbonate and sulphide ores are first converted to oxides for extracting the metals.

Q- 13. You must have seen tarnished copper vessels being cleaned with lemon or tamarind juice. Explain why these sour substances are effective in cleaning the vessels.

Answer:

The sour substances such as lemon or tamarind juice contain acids. These acids dissolve the coating of copper oxide or basic copper carbonate present on the surface of tarnished copper vessels and makes them shining red-brown again.

Q- 14. Differentiate between metal and non-metal on the basis of their chemical properties.

Answer:

Difference between metals and non-metals

Metals	Non-metals
(i) Metals form basic oxides or amphoteric oxides.	(i) Non-metals form acidic or neutral oxides.
(ii) Metals replace hydrogen from acids and form salts.	(ii) Non-metals do not replace hydrogen from acids.
(iii) With chlorine, metals form chlorides which are electrovalent.	(iii) With chlorine, non-metals form chlorides which are covalent.
(iv) With hydrogen few metals form hydrides which are electrovalent.	(iv) With hydrogen, non-metals form many stable hydrides which are covalent.

Q- 15. 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. 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 has used ?

Answer:

The dishonest goldsmith dipped the gold bangles in aqua-regia (which contains 1 part of concentrated nitric acid and 3 parts of concentrated hydrochloric acid, by volume). Aqua-regia dissolved a considerable amount of gold from gold bangles and hence reduced their weight drastically. The dishonest goldsmith can recover the dissolved gold from aqua-regia by a suitable treatment.

Q- 16. Give reasons why copper is used to make hot water tanks and not steel (an alloy of iron).

Answer:

- (i) Copper is a better conductor of heat than steel.
- (ii) Copper does not corrode easily. But steel corrodes easily.
- (iii) Copper does not react with water at any temperature, whereas iron reacts with water on heating.

Science Chapter 3 Metals and Non-metals

Q- 1. What are amphoteric oxides? Give two examples of amphoteric oxides.

Solution:

Amphoteric oxides are the oxides, which react with both acids and bases to form salt and water. E.g. ZnO and Al_2O_3 .

Q- 2. Name two metals, which will displace hydrogen from dilute acids, and two metals which will not.

Solution:

Very reactive metals like Zn and Mg displace hydrogen from dilute acids. On the other hand less reactive metals like Cu, Ag, etc. do not displace hydrogen from dilute acids.

Q- 3. In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte?

Solution:

Anode is impure, thick block of metal M.

Cathode is a thin strip/wire of pure metal M.

Electrolyte is a suitable salt solution of metal M.

Q- 4. State two ways to prevent the rusting of iron.

Solution:

By coating the surface of iron by rust proof paints.

By applying oil or grease to the surface of iron objects so that supply of air consisting of moisture is cut off from the surface.

Q- 5. What types of oxides are formed when non-metals combine with oxygen?

Solution:

When non-metals combine with oxygen it forms either neutral or acidic oxides. CO is a neutral oxide; N_2O_5 or N_2O_3 is an acidic oxide.

Extraction of metals from ores Q- 6

Give reason

- i. Metals replace hydrogen from dilute acids, where as non-metals do not.
- ii. Carbonate and sulphide ores are usually converted into oxides during the process of extraction.

Solution:

- i. Metals are electropositive in nature. They readily lose electrons. These electrons reduce the protons liberated from the acid to liberate hydrogen gas, where as non-metals possess a tendency to gain electrons and hence they do not furnish electrons to protons liberated from acids. Hence H_2 gas is not liberated.
- ii. As it is easier to reduce metal oxides to metal, prior to reduction, metal sulphides and carbonates must be converted to oxides.

Q- 7

Differentiate between metals and non-metals on the basis of their chemical properties.

Solution:

Metals	Non-metals
Metals on heating with oxygen form ionic oxides, which are basic in nature and which dissolve in water to form bases, which turn red litmus blue.	Non-metals on heating with oxygen form covalent oxides which are acidic in nature and dissolve in water to form acids, which turn blue litmus red.
Lustrous	Non-lustrous except graphite
Conductor of electricity and heat	Non-conductor of heat and electricity, except graphite
All are solid except mercury	Solid-liquid-gaseous
Electro positive. Loses electrons readily and becomes a positive ion	Electro negative: gain electrons and become negative ions.
Metals are reducing agents	Non-metals are good oxidizing agents

Q- 8. Explain why the surface of some metals acquires a dull appearance when exposed to air for a long time.

Solution:

This is due to the surface oxidation of metals when exposed to moist air. For e.g. copper turns green on its surface due to the formation of basic copper carbonate $Cu(OH)_2 \cdot CuCO_3$. Similarly silver becomes black due to the formation of black Ag_2S and Aluminium forms a white coating of Al_2O_3 on its surface.

Q- 9. State which of the following metals would give hydrogen when added to dilute hydrochloric acid. i. Iron, ii. Copper iii. Magnesium

Copper does not react with dilute hydrochloric acid at all. This shows that copper is even less reactive than iron.



Q- 10. Name a non-metallic element, which conducts electricity.

Solution:

Carbon in the form of graphite conducts electricity, as there is a free electron in each carbon atom, which moves freely in between the hexagonal layers.

Q- 11. Which metals do not corrode easily?

Solution:

Gold and platinum and other noble metals do not corrode in air.

Q- 12. What are alloys?

Solution:

Alloys are homogeneous mixtures of two or more metals, or a metal and a non-metal. E.g. steel, brass, bronze, etc.

Q- 13. Define the following terms.

(i) Minerals

(ii) Ores

(iii) Gangue

Solution:

(i) Minerals

All compounds or elements, which occur naturally in the earth's crust, are called minerals. Example: Alums, $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24 \text{H}_2\text{O}$, Bauxite $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$

(ii) Ores

Those minerals from which a metal can be profitably extracted are called ores. Bauxite ($\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$) is the ore of Al, copper pyrite CuFeS_2 . All minerals are not ores but all ores are minerals.

(iii) Gangue

When an ore is mined from the earth, it is always found to be contaminated with sand rocky materials. The impurity of sand and rock materials present in the ore is known as gangue.

Q- 14. Name two metals that are found in nature in the free state.

Solution:

Gold and platinum are found in the free state in nature.

Q- 15. What is chemical process used for obtaining a metal from its oxide?



Q- 16. Name two metals, which can form hydrides with metals.

Solution:

Sodium and calcium form stable hydrides on reacting with hydrogen.

Q- 17. Does every mineral have a definite and a fixed composition? Explain.

Solution:

Yes, every mineral has a definite and a fixed composition. Minerals are widely distributed in the earth's crust in the form of oxides, carbonates, sulphides, sulphates, nitrates, etc. These minerals are formed as a result of chemical changes taking place during the formation of earth.

Class 10 metals and nonmetals Q- 18

Explain the meaning of malleable and ductile.

Solution:

Malleable is being able to be beaten/hammered into thin sheets.

Ductile is being able to be drawn into thin wires.

Q- 19

i. Write the electron dot structures for sodium, oxygen and magnesium.

ii. Show the formation of MgO and Na₂O by the transfer of electrons.

iii. What are the ions present in these compounds?

Solution:

i. Sodium: Na[•]

Oxygen: $\cdot\ddot{\text{O}}\cdot$

Magnesium: Mg[•]

ii. Formation of Magnesium oxide

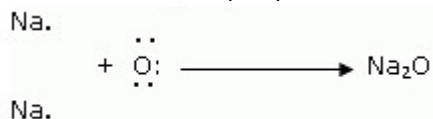
When magnesium reacts with oxygen, the magnesium atom transfers its two outermost electrons to an oxygen atom. By losing 2 electrons, the magnesium atoms form a magnesium ion (Mg²⁺) and by gaining 2 electrons, the oxygen atom forms an oxide ion (O²⁻).



Formation of Sodium oxide

Two sodium atoms transfer their 2 outermost electrons to an oxygen atom. By losing two electrons, the two sodium atoms form two sodium ions (2Na⁺). And by gaining two electrons, the oxygen atom

forms an oxide ion (O^{2-} .)



iii. The ions present in sodium oxide compound (Na_2O) are sodium ions (2Na^+) and oxide ions (O^{2-}). The ions present in Magnesium oxide compound (MgO) are magnesium ions Mg^{2+} and oxide ions (O^{2-}).

Q- 20. You must have seen tarnished copper vessels being cleaned with lemon or tamarind juice. Explain why these sour substances are effective in cleaning the vessels.

Solution:

The sour substances such as lemon (or tamarind juice) contain acids. These acids dissolve the coating of copper oxide or basic copper carbonate present on the surface of tarnished copper vessels and make them shining red-brown again.

Q- 21. Give an example of a metal which

- i. is a liquid at room temperature.
- ii. can be easily cut with a knife.
- iii. is the best conductor of heat.
- iv. is a poor conductor of heat.

Solution:

- i. Mercury is in liquid state at room temperature.
- ii. Sodium and potassium are soft metals which can be easily cut with a knife.
- iii. Silver is the best conductor of electricity.
- iv. Mercury is a poor conductor of heat.

Q- 22. Why is sodium kept immersed in kerosene?

Solution:

Sodium metal is kept immersed in kerosene to prevent their reaction with oxygen, moisture and carbon dioxide of air.

Q- 23. Why do ionic compounds have high melting points?

Solution:

These compounds are made up of positive and negative ions. There is a strong force of attraction between the oppositely charged ions, so a lot of heat energy is required to break this force of attraction and melt the ionic compounds. This is why ionic compounds have high melting points.

Q- 24. 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. 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?

Solution:

Aqua regia (By volume, this contains 3 parts of concentrated hydrochloric acid and 1 part of concentrated nitric acid) is the solution, which is used to sparkle the bangles like new, but their weight will be reduced drastically.

Q- 25. Write equations for the reactions of

(i) iron with water

(ii) calcium and potassium with water

Solution:

(i) Iron reacts with steam to form magnetic oxide of Fe with the liberation of H_2 .



(ii) Calcium reacts with water to form calcium hydroxide and hydrogen.



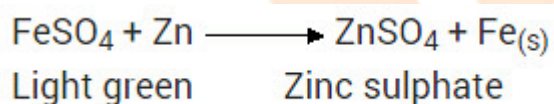
Potassium reacts with cold water violently immediately with evolution of H_2 which catches fire.



Q- 26. What would you observe when zinc is added to a solution of iron(II) sulphate? Write the chemical reaction that takes place?

Solution:

Zinc is more reactive (more electro positive) than iron. Therefore it displaces iron from its salt solution. The colour of ferrous sulphate is pale green which becomes colourless.



Metals and nonmetals class 10

Q- 27. Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test-tube over the burning sulphur.

What will be the action of this gas on:

Dry litmus paper?

Moist litmus paper?

Write a balanced chemical equation for the reaction taking place.

Solution:

a) When sulphur is burnt in air then sulphur dioxide gas is formed.

(i) Sulphur dioxide gas has no action on dry litmus paper.

(ii) Sulphur dioxide gas turns moist blue litmus paper to red.

(b) $S_{(s)} + O_{2(g)} \rightarrow SO_{2(g)}$

Multiple Choice Q-s (MCQs)

Metals and nonmetals class 10

Q- 1. What is the colour of aqueous solution of $CuSO_4$ and $FeSO_4$ as observed in the laboratory?

(a) $CuSO_4$ – blue; $FeSO_4$ – light green

(b) $CuSO_4$ – blue; $FeSO_4$ – dark green

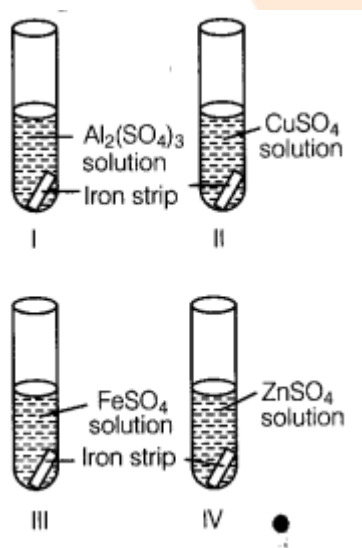
(c) $CuSO_4$ – green; $FeSO_4$ – blue

(d) $CuSO_4$ – green; $FeSO_4$ – colourless

Answer:

(a) Colour of $CuSO_4$ solution is blue and $FeSO_4$ solution is light green.

Q- 2. A student took four test tubes I, II, III and IV containing aluminium sulphate, copper sulphate, ferrous sulphate and zinc sulphate solutions respectively. He placed an iron strip in each of them.



In which test tube, he found a brown deposit?

(a) I

(b) II

(c) III

(d) IV

Answer:

(b) In test tube II, because Fe is more reactive than copper but less reactive than Al and Zn.

Q- 3. Aluminium sulphate and copper sulphate solutions were taken in two test tubes I and II respectively. A few pieces of iron filings were then added to both the solutions. The four students A, B, C and D recorded their observations in the form of a table as given below:

Student	$\text{Al}_2(\text{SO}_4)_3$ solution (I)	CuSO_4 solution (II)
A	Colourless solution $\rightarrow$ Light green	Blue colour is retained
B	Colourless solution $\rightarrow$ No change	Blue colour solution $\rightarrow$ Green
C	Colourless solution $\rightarrow$ Light blue	Blue colour solution $\rightarrow$ Green
D	No change in colour	Blue colour of solution fades

Which student has recorded the correct observation?

(a) D

(b) C

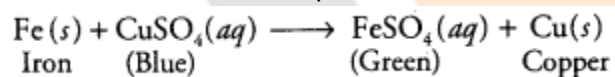
(c) B

(d) A

Answer:

(c) Student B

Iron does not react with $\text{Al}_2(\text{SO}_4)_3$ solution because iron is less reactive than aluminium. But Fe being more reactive than Cu displaces Cu from CuSO_4 solution.



Q- 4. Aqueous solutions of zinc sulphate and iron sulphate were taken in test tubes I and II by four students A, B, C and D. Metal pieces of iron and zinc were dropped in the two solutions and observations made after several hours were recorded in the form of table as given below:

Student	Metal	Solution	Colour change Deposit/coating of solution	Deposit/coating obtained
A	Fe	ZnSO_4	Turned green	Silvery grey deposit
	Zn	FeSO_4	No change	No change

B	Fe	ZnSO ₄	No change	Black deposit
	Zn	FeSO ₄	Colour faded	Grey coating
C	Fe	ZnSO ₄	No change	No change
	Zn	FeSO ₄	Turned colourless	Black deposit
D	Fe	ZnSO ₄	No change	Grey deposit
	Zn	FeSO ₄	No change.	Black deposit

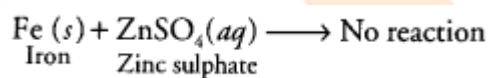
Which student has given the correct report?

- (a) B
- (b) D
- (c) A
- (d) C

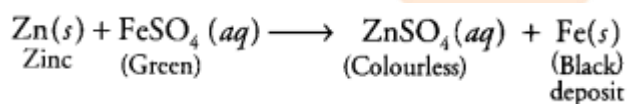
Answer:

- (d) Student C

(i) Fe is less reactive than zinc. So,



(ii) Zn is more reactive than Fe, so it displaces iron as follows:



Q- 5. 2 mL each of cone. HCl, cone. HNO₃ and a mixture of cone. HCl and cone. HNO₃ in the ratio of 3 : 1 were taken in test tubes labelled as A, B and C. A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal got dissolved in test tube C. The metal could be

- (a) Al
- (b) Au
- (c) Cu
- (d) Pt

Answer:

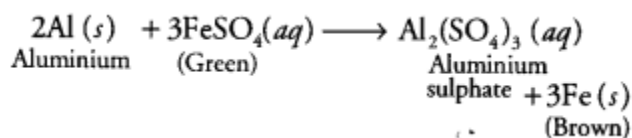
(b, d) A mixture of cone. HCl and cone. HNO₃ in the ratio of 3 : 1 is known as aqua-regia. Gold (Au) and platinum (Pt) dissolve only in aqua-regia as these metals are very less reactive.

Q- 6. When an aluminium strip is kept (a) Green solution of FeSO₄ slowly turns brown

- (b) Green solution of FeSO₄ rapidly turns brown
- (c) No change in colour of FeSO₄
- (d) Green solution of FeSO₄ slowly turns colourless

Answer:

(a) The green solution of ferrous sulphate slowly turns brown. As aluminium is more reactive than iron, it displaces iron from ferrous sulphate solution.



Q- 7. Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?

- (i) Good thermal conductivity
 - (ii) Good electrical conductivity
 - (iii) Ductility
 - (iv) High melting point [NCERT Exemplar]
- (a) (i) and (ii)
 - (b) (i) and (iii)
 - (c) (ii) and (iii)
 - (d) (i) and (iv)

Answer:

(d) Good thermal conductivity, malleability, light weight and high melting point are the properties/of aluminium due to which it is used for making cooking utensils.

Q- 8. If copper is kept open in air, it slowly loses its shining brown surface and gains a green coating. It is due to the formation of

- (a) CuSO₄
- (b) CuCO₃
- (c) Cu(NO₃)₂
- (d) CuO

Answer:

(b) Copper reacts with CO₂ present in air and forms a green coating on its surface due to the formation of basic copper carbonate [CuCO₃·Cu(OH)₂] as:

