CHEMISTRY

BOOKS - OSWAAL CHEMISTRY (KANNADA ENGLISH)

METALS AND NON-METALS

Topic 1 Multiple Choice Questions

1. Observe the following chemical equations and identify the correct statement.

(i) $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$

(ii) $2AgNO_3 + Cu \rightarrow Cu(NO_3)_2 + 2Ag$

A. Copper is more reacive than iron and Silver.

B. Iron is less reactive than copper and silver.

C. Copper is more reactive than Silver but less than Iron.

D. Silver is more reactive than Copper and iron.

Answer: C

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2. The most abundant metal in earth's crust is

:

A. Cu

B. Al

C. O_2

D. Fe

Answer: B

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Topic 1 Match The Column

1.

Column A	Column B
1. Calamine	(a) Iron
2. Galana	(b) Aluminium
3. Haematite	(c) Zinc
4. Cinnabar	(d) Lead
5. Bauxite	(e) Mercury

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Topic 1 Very Short Answer Type Questions

1. Name one metal and non-metal which exists in liquid state at room temperature ?

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2. Give an example of a metal which is the best conductor of heat.

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3. State two physical properties of gold which are of extreme use to jewellers.

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4. Name the metal which has very low melting point and can melt with heat of your palm ?

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5. An element X forms an oxide which turns red litmus blue.

Identify whether X is a metal or non-metal.

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6. Name a non-metal which is lustrous and a metal which is non-lustrous.

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7. Make a distinction between metals and non-metal with respect to the nature of their oxide.

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8. Which gas is usually liberated when an acid reacts with a metal ?

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9. Name the metal which reacts with a very dilute HNO_3 to evolve hydrogen gas.

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10. Why do silver articles become black after sometime when exposed to air ?

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Topic 1 Short Answer Type Questions I

1. Write any four physical properties of metals.

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2. The given equations represents the reaction of Copper Sulphate with an element X.

$CuSO_4 + X \rightarrow Cu + Y$

Which element is represented by X, among Fe and Ag ? Justify your answer. Write the molecular formula of the compound represented by Y.

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3. Draw the diagram of blast furnace used in the extraction of iron.

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4. Name two solid metals and two solid non-metals along with their symbols.

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5. Name two metals that start floating after sometime when immersed in water and explain why they do so.

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6. Explain why calcium metal after reacting with water starts floating on its surface. Write the chemical equation for the reaction.

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7. Name the following :

(i) Metal, which is preserved in kerosene.

(ii) A lustrous coloured non-metal.

(iii) A metal, which can melt while kept on palm.

(iv) A metal, which is a poor conductor of heat.

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8. Give reasons for the following :

(i) Metals are good conductors of electricity whereas non-metals are not.

(ii) Ionic compounds have usually high melting and boiling points.

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9. Give reasons :

(i) Sodium metal is stored under kerosene oil.

(ii) Inspite of being highly reactive, aluminium is still used for making utensils.

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10. Give reasons for the following :

(i) School bells are made up of metals.

(ii) Electrical wires are made up of copper.

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11. Mercury is the only metal found in the liquid state. It is largely used in thermometers to measure the temperature. But mercury is a very dangersous precautions you would take

while handling the equipment containing mercury ?

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12. A metal 'X' combines with a non-metal 'Y' by the transfer of electrons to form a compound Z.

(i) State the type of bond in compound Z.

(ii) What can you say about the melting point and boiling point of compound Z ?

(iii) Will this compound dissolve in kerosne or

petrol ?

(iv) Will this compound be a good conductor of electricity ?

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13. Write two observations that you will make when an iron nail is kept in an aqueous solution of copper sulphate. Write the chemical equations for this reactions.

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14. Out of the two metals P and Q, P is less reactive than Q. Suggest an activity to arrange these metals in the order of their decreasing reactivity. Support your answer with a suitable chemical equation.

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15. A metal is found in liquid state. It is widely used in instrument for measuring blood pressure. In what form does it occur in nature ? How can we extract this metal from its ore ?

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16. Why are aluminium and copper metals used for making cooking vessels ?

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Topic 1 Short Answer Type Questions Ii

1. List three properties of sodium by which it differs from the general physical properties of

most metals.

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2. Compare the properties of a typical metal and a non-metal on the basis of the following :

(i) Nature of the oxide formed by them

(ii) Conducticity.

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3. Name a non-metal which is lustrous and a metal which is liquid at the room temperature.

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4. Write one example of each of the following :

(i) Most malleable metal and most ductile metals.

The best condcutor of heat and the poorest conductor of heat.

(iii) A metal with highest melting point and a metal with lowest melting point.

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5. (i) A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance whereas Z is a good conductor of electricity. Identify X, Y, Z.

(ii) A element, X, on reaction with oxygen forms an oxide XO_2. The Oxide when dissolved in water turns blue litmus red. State

whether element X is a metal or a non-metal.

(ii) Name the metal which is alloyed with copper to make bronze.

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6. State reason for the following :

(i) Non-metals cannot displace hydrogen from the acids.

(ii) Hydrogen is not a metal, yet it is placed in the activity series of metals.

(iii) Aluminium is more reactive than iron, yet its corrosion is less than that of iron.

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7. Give reason for the following :

(i) Metals conduct electricity.

(ii) Reaction of nitric acid with metals generally does not evolve hydrogen gas.

(iii) For making gold ornaments, 22 carat gold is preferred to 24 carat gold.

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8. Give reason for the following :

(i) Aluminium is a reactive metal but is still used for packing food articles.

(ii) Calcium starts floating when water is added to it.

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9. Arrange the following metals in the order their decreasing reactivity :

Aluminium, Gold , Sodium, Copper

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10. Give chemical equation for the reaction of aluminium powder with maganese dioxide on heating.

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11. Write balanced equations for the reactions of :

(i) Aluminium when heated in air. Write the

name of the product.

(ii) Iron with steam. Name the product obtained.

(iii) Calcium with water. Why does calcium start floating in water ?

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12. Write the balanced chemical equations for the following reactions :

(i) When copper is heated in air.

(ii) When aluminium oxide reacts with sodium hydroxide.

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13. Describe an activity to show that the rusting of iron occurs in the presence of air and moisture.

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14. You are given samples of three metals : Sodium, magnesium and copper. Suggest any two activities to arrange them in order to their decreasing reactivity.

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15. There are 115 elements known till today. Some of them are metals and some are non-metals. Metals are usually hard, malleable and ductile and have metallic lustre. Non-metals

are usually soft, do not posses lustre and are not malleable and ductile. But iodine is a non-metal which has metallic lustre. Iodine is also important for us. Non-metals are bad conductors of heat and electricity.

(i) Why iodine is important for us ?

(ii) Name a non-metal which is good conductor of heat and electricity.

(iii) As a student, what initiative you will take to comment on the statement that "Iodised salt is good for health". Give any two suggestions.

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16. Compose an activity to arrange Ca, Mg and Fe metals in the decreasing order of reactivity with water. Write suitable balanced chemical equations and draw diagrams.

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17. How is the method of extraction of metals high up in the reactivity series different from that metals in the middle ? Why the same

process cannot be applied for them ? Explain giving equations, the extractions of sodium.

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Topic 2 Multiple Choice Questions

1. The oxides of very reactive metals are reduced to metals by :

A. electrolytic reduction

B. heating with carbon

C. heating with aluminium

D. liquation

Answer: A

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2. The process of smelting is associated with the extraction of :

A. Cu

B. Fe

C. Al

D. S

Answer: B

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Topic 2 Very Short Answer Type Questions

1. What is meant by metallurgy ?

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2. What is thermite reaction?

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3. Aluminium and zinc do not corrode easily even though they are reactive metals. Give reasons for your answer.

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4. Why do we apply paint on iron articles ?

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5. Why is carbon not used for reducing aluminium from aluminium oxide ?

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6. A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance, where as Z is a good conductor of electricity. Identify X, Y and Z.

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7. What happens when $ZnCO_3$ is heated in the absence of air ? Give the relevant equation.

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Topic 2 Short Answer Type Questions I

1. What are ionic compounds ? List two properties of these compounds.

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2. Draw the diagram of an electrolytic cell used in the purification of copper and label in the purification of copper and label the electrode having impure copper.

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3. Why do ionic compounds have high melting points ? State reason.

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4. Define amphoteric oxides. Give two examples of such oxides.

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5. Explain the steps for extraction of copper from its sulphide ore. Write the balanced equations involved in the process.

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6. Define ionic compounds. Ionic compounds conduct electricity only in the molten state and not in solid state. Why ?

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7. Differentiate roasting and calcination process giving one example of each.

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8. Write symbols of cation and anion present in MgO. Why do ionic compounds have higher melting points ?

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9. Name a metal/non-metal :

(i) Which makes iron hard and strong ?

(ii) Which is alloyed with any other metal to make an amalgam ?

(iii) Which is used to galvanise iron articles ?

(iv) Whose articles when exposed to air form a black coating ?

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10. A metal 'M' is found in nature as its carbonate. It is used in the galvanization of iron. Identify 'M' and name its ore. How will you convert this ore into free metal ?

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11. Name one metal each which is extracted by

:

(i) Reduction with carbon

(ii) Electrolytic reduction

(iii) Reduction with aluminium

(iv) Reduction with heat alone

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12. Describe briefly the method to obtain mercury from Cinnabar. Write the chemical

equations for the reactions involved in the process.

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13. An aluminium can is used to store ferrous sulphate solution. It is observed that in few days holes appeared in the can. Explain the observation and write the chemical equations to support your answer.

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

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15. What are the constituents of solder alloy ? Which property of solder makes it suitable for welding electrical wires ?

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16. Corrosion is a serious problem. Every year an enormous amount of money is spend to replace damaged iron. What steps can be taken to prevent this damage ?

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17. A metallic ore 'X' reacts with dilute HCl to liberate a gas which turns lime water milky. Another ore 'Y' gives off a gas with the smell of rotten eggs on treatment with the same acid.

Which metallurgical processes are used for the extraction of the metals X and Y ?

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Topic 2 Short Answer Type Questions Ii

1. Describe electrolytic refining of copper with chemical equations. Draw a well as labelled diagram for it.

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2. Define (i) mineral (ii) ore.

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

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3. (i) What is meant by corrosion ?

(ii) Why do aluminium sheets not corrode easily.

(iii) Why is copper vessel covered with a green coating in rainy season ?

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4. Define alloys. List the properties of alloys that make them useful over pure metals ? Explain this fact with suitable examples.

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5. (i) "Sodium is a highly reactive metal and it cannot be obtained from its oxide by heating with carbon". Give reason.

(ii) How can sodium be obtained from sodium chloride ?

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6. (i) Explain the formation of ionic compound CaO with electron dot structure. Atomic number of calcium and oxygen are 20 and 8 respectively.

(ii) Name the constituent metals of bronze.

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7. Give reasons for the following :

(i) Ionic compounds have high melting point and boiling point.

(ii) Ionic compounds conduct electricity in molten state.

(iii) Ionic compounds are solids at room temperature and are somewhat hard.

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8. Illustrate the formation of bond in :

(i) Sodium chloride (ii) Magnesium chloride.

Identify the ions present in these compounds.

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9. What is cinnbar ? How is a metal extracted from cinnabar ? Explain briefly.

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10. Zinc is a metal found in the middle of the activity series of metals. In nature, it is found as a carbonate ore, $ZnCO_3$. Mention the

steps carried out for its extraction from the ore. Support with equations.

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11. Which method will you use to reduce the following ?

(i) Oxides of less reactive metals

(ii) Oxides of moderately reactive metals

(iii) Oxides of highly reactive metals.

explain by giving a suitable example.

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12. In a thermite reaction, a compound of iron reacts with a metal :

(i) Name the metal used in this reaction.

(ii) After completion of this reaction, a metal is obtained in the molten state. Identify the metal.

(iii) Represent this reaction in the form of a balanced chemical equation.

(iv) Mention the most common use of this reaction.

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13. Zinc is the metal which lies in the middle of the activity series. This metal is extracted from its sulphide ore. Outline the steps involved in the process of extraction of zinc metal with the help of balanced chemical equation for each step.

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Topic 2 Long Answer Type Questions

1. Observe the following chemical equations :

(i) $Al_2O_3 + 2NaOH \rightarrow 2NaAlO_2 + H_2O$

(ii) $Al_2O_3 + 6HCl \rightarrow 2AlCl_3 + 3H_2O$

What is the conclusion that you take about the nature of aluminium oxide with the help of these equations. Give reason for your conclusion.

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2. Molten cryolite is mixed with molten alumina in the extraction of aluminium by

electrolysis. Why ? Name the substances that are used as anode and cathode in this method.

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3. Define the terms 'alloy' and 'amalgam'. Name the alloy used for welding electric wires together. What are its constituents ?

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4. Name the constituents of the following alloys :

(i) Brass (ii) Stainless steel (iii) Bronze,

State one property in each of these alloys, which is different from its main constituents.

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5. Define the term alloy. Write two advantages of making alloys.

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6. A metal 'X' which is used in thermite process, when heated with oxygen gives an oxide 'Y' which is amphoteric in nature. Identify X and Y. Write down balanced chemical equations of the reactions of oxide Y with HCl and NaOH.

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7. Give reason for the following :

(i) Ionic compound have high melting and

boiling points.

(ii) Ionic compounds are soluble in water.

(iii) Ionic compounds conduct electricity in molten state.

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8. Show the formation of MgO by transfer of electrons.

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9. When calcium metal is added to water, the gas evolved does not catch fire but the same gas evolved on adding potassium metal to water catches fire. Explain why ?

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10. Name a metal for each case :

(i) It displaces hydrogen gas from nitric acid.

(ii) It does not react with any physical state of water.

(iii) It does not react with cold as well as hot water but reacts with steam.

11. (i) Carbon cannot be used as reducing agent to obtain Mg from MgO. Why ?

(ii) How is sodium obtained from molten sodium chloride ? Give equations of the reactions.

(iii) How is copper obtained from its sulphide ore ? Give equations of the reactions.

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12. Write the chemical name of the coating that forms on silver and copper articles when these are left exposed to moist air.

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13. Explain what is galvanization. What purpose is served by it ?

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14. Define an alloy. How are alloys prepared ? How do the properties of iron change when :

(i) small quantity of carbon is mixed ?

(ii) nickel and chromium are mixed with it ?

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15. Write the name and symbols of two most reactive metals. Explain by drawing electronic structure how any one of the two metals react

with a halogen. State any four physical properties of the compound formed.

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16. (i) Write the electron-dot structures for sodium (11) oxygen (8), chlorine (17) and magnesium (12) show the formation of Na_2O and MgO by the transfer of electrons.

(ii) Name the ions present in these compounds.

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17. (i) Name the method used to extract metals of high reactivity.

(ii) Name the main ore of mercury. How is mercury obtained from its ore ? Give balanced chemical equations.

(iii) Explain what is thermite reactions with the help of balanced equation. How is it used join railway tracks or cracked machine parts ?

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18. Some metals react with water and produce metal oxides or hydroxides and liberated hydrogen gas. Metals like sodium and potassium react violently with cold water. However, calcium reacts less violently with cold water because it is less reactive as compared to Na and K. Magnesium does not react with cold water. It reacts with hot water to form magnesium hydroxide and hydrogen gas. Metals like aluminium, iron and zinc do not react with cold as well as hot water but they react with steam to form metal oxide and

hydrogen gas.

(i) Which gas is produced when reactive metal reacts with water ?

(ii) How can we extinguish fire ?

(iii) Why is sodium kept in kerosene oil ?

(iv) Which metal did not react with water even in the presence of steam ?

(v) How can we prevent iron from rust ?

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Ncert Corner Intext Questions

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.

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2. Explain the meanings of malleable and ductile.

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3. Why is sodium kept immersed in kerosene oil ?

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4. Write equations for the reactions.

(i) Iron with steam

(ii) Calcium and potassium with water

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5. Samples of four metals A, B, C and D were taken and added to the following solutions one by one. The results obtained have been tabulated as follows :

Metals	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 given above to answer the following questions about metals A, B, C and D.

(i) Which is the most reactive metal ?

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

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6. Which gas in produced when dilute hydrochloric acid as added to reactive metal ? Write the chemical reaction when iron reacts with dilute H_2SO_4.

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

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

(ii) Show the formation of Na_2O and MgO by the transfer of electrons.

(iii) What are the ions present in these compounds.

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9. Why do ionic compounds have high melting point ?

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10. Define the following terms.

(i) Mineral (ii) ore (iii) Gangue

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11. Name two metals which are found in nature in a free state.

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12. What chemical process is used for obtaining a metal from its oxide ?

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13. Metallic Oxides of zinc, magnesium and copper were heated with the following metals.

Metal Oxide	Zinc	Magnesium	Copper
Zinc Oxide			
Magnesium Oxide			
Copper Oxide			

In which cases, will you find displacement reactions taking place ?

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14. Which metals do not corrode easily ?

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15. What are alloys ?

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Ncert Corner Textbook Exercises

1. Which of the following is double displacement reaction ?

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

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2. Which of the following method is suitable preventing an iron frying pan from rusting

A. Applying grease

B. Applying paint

C. Applying a coating of zinc

D. All of the above

Answer: C

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3. An element reacts with oxygen to give a compound with 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: D

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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 more reactive than tin

D. Zinc is less reactive than tin

Answer: C

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

(a) How coulf you see 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.

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6. Define amphoteric oxides. Give two examples of such oxides.

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

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8. In the electrolyte refining of a meal M, what would take the anode, the cathode and the electrolyte ?

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

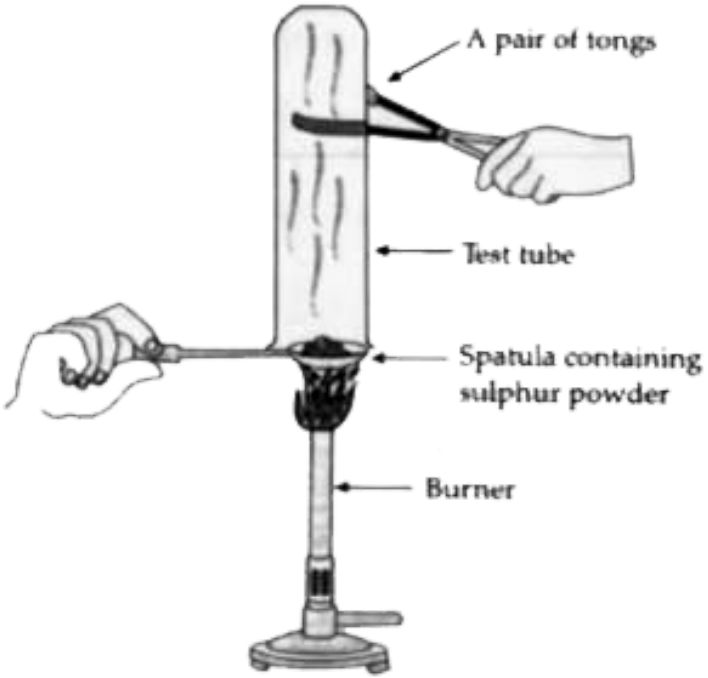
(a) What will be the action of gas on :

(i) dry litmus paper ?

(ii) moist litmus paper ?

(b) Write a balanced chemical equation for the

reaction taking place.



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

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

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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 ones are usually converted into oxides during the process of extracting.

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13. You must have been seen tarnished copper vessels being cleaned with lemon or tamarind

juice. Explain why those sour substances are effective in cleaning the vessel.

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

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15. A man went door to door posing 2s 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 had a hasty retreat. Canyou play the detective to find out the nature of the solution he had used ?

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

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