



CHEMISTRY

BOOKS - MTG IIT JEE FOUNDATION

MATERIALS : METALS AND NON- METALS

Illustrations

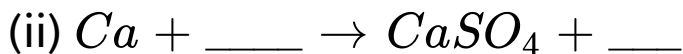
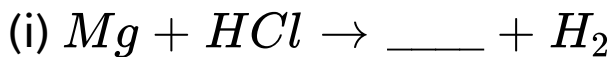
1. Identify the metal on the basis of the property mentioned.

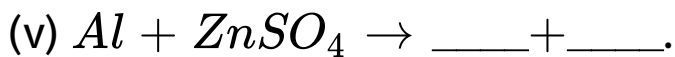
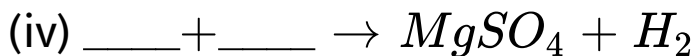
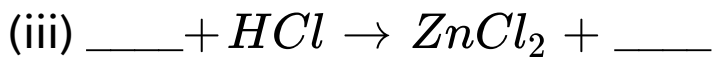
- (a) Liquid at room temperature.
- (b) Does not corrode even after several years.
- (c) Develops a green layer on the surface, in presence of moist air.
- (d) It is stored in kerosene.
- (e) Has magnetic properties and is rusted.



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2. Complete the following reactions,





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3. Why is sodium metal kept under kerosene oil ?



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4. What are the main differences between metal and non-metals ?



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5. What are noble gases ? Why are they so named ?



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6. Write some important uses of phosphorus and sulphur.



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7. Write various methods to prevent corrosion.



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8. Give names of the following metals :

(i) The best conductor of electricity

(ii) The metal used for preventing rusting of iron

(i) A metal which can be cut with a knife

(iv) A metal which is present in the blood



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9. Name the non-metals which show the following properties :

(i) A non-metal which has lustre and is a good conductor of electricity.

(ii) A non-metal which is the hardest natural

substance.

(iii) A non-metal which is essential for respiration

(iv) A non-metal which is the source of energy in the sun and stars.



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10. (a) What is the most important ore of aluminium ? What is its formula ?

(b) How aluminium extracted from the ore ?

(c) Why is alumina dissolved in molten cryolite before subjecting it to electrolysis ?

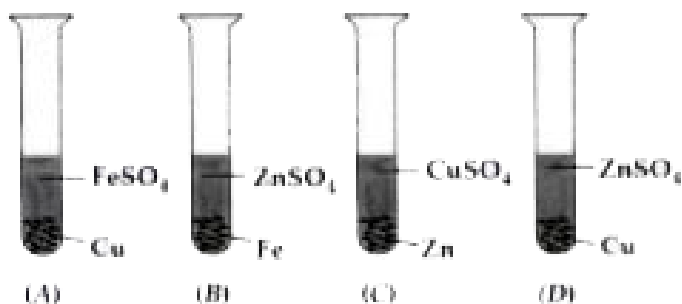


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Solved Examples

1. In the following four test tubes, some metals are in contact with certain salt solutions. After the experiment, in which of the test tubes does the solution become colourless and a powdery red mass is deposited at the bottom

of the test tube ?



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2. A silver spoon is kept immersed in an aqueous solution of copper sulphate. What change will take place ?



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3. A solution of copper sulphate was stored in an iron container. After a few days, some holes were seen in the iron container. Explain the observation.



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4. What happens when samples of metals and non-metals are mixed with acids ?



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5. Compare metals and non-metals on the basis of chemical properties.



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6. Name the metals present in the bases and non-metals present in the acids listed below:

(i) Slaked lime (ii) Magnesium hydroxide (iii)

Caustic soda

(iv) Zinc hydroxide

(v) Sulphuric acid

(vi) Nitric acid

(vii) Phosphoric acid

(viii) Carbonic acid



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7. Which of the following reaction cannot take place ? Justify your answer.

(i) Iron + zinc sulphate \rightarrow Iron sulphate + Zinc

(ii) Magnesium + Silver nitrate \rightarrow Magnesium nitrate + Silver

(iii) Copper + dil. sulphuric acid \rightarrow Copper sulphate + Hydrogen

(iv) Zinc + ferrous sulphate \rightarrow Iron + zinc sulphate

A. *i, ii and iii*

B. *iii and iv only*

C. *i and iii only*

D. *i, ii, iii and iv*

Answer:



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8. Complete and balance the chemical equation for the following reactions:

(i) Sulphur+Oxygen \rightarrow

(ii) Phosphorus+Oxygen \rightarrow

(iii) Carbon+Oxygen \rightarrow

(iv) Zinc+Oxygen \rightarrow

(v) Sodium+Oxygen \rightarrow



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9. Explain reaction of sodium, magnesium and iron with water.



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10. (i) What is an alloy ?

(ii) A light and strong alloy is required for making bodies of aircrafts what should be its constituents ?



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11. Define the terms : Galvanized iron and passive iron.



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12. Metal M occurs in earth's crust as its oxide M_2O_3 . An alloy of this metal is used in making aircrafts. Name the metal M and its oxide.



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13. Are metals a renewable resources ? If not, can they be recycled ?



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14. What is malleability ? Name two most malleable metals.



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15. Explain the reaction of sodium and water with the help of an activity.



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Ncert Section

1. Which of the following can be beaten into thin sheets?

A. Zinc

B. Phosphorus

C. Sulphur

D. Oxygen

Answer: A



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2. Which of the following statements is correct

?

A. All metals are ductile

B. All non-metals are ductile.

C. Generally, metals are ductile

D. Some non-metals are ductile

Answer: C



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3. Fill in the blanks

(a) Phosphorus is very ___ non-metal

(b) Metals are ___ conductors of heat and ___.

(c) Iron is ____ reactive than copper.

(d) Metals react with acids to produce ___ gas.



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4. Mark 'T' if the statement is true and 'F' if it is false.

(a) Generally, non-metals react with acids.

(b) Sodium is a very reactive metal.

(c) Copper displaces zinc from zinc sulphate solution.

(d) Coal can be drawn into wires.



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5. Some properties are listed in the following Table. Distinguish between metals and non-metals on the basis of these properties.

Properties	Metals	Non-metals
1. Appearance		
2. Hardness		
3. Malleability		
4. Ductility		
5. Heat Conduction		
6. Conduction of Electricity		



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6. Give reasons for the following.

(a) Aluminium foils are used to wrap food items.

(b) Immersion rods for heating liquids are made up of metallic substances.

(c) Copper cannot displace zinc from its salt solution.

(d) Sodium is stored in kerosene.



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7. Can lemon pickle be stored in an aluminium utensil? Explain.



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8. Match the items in column I with the uses in column II.

	Column I		Column II
(i)	Gold	(a)	Thermometers
(ii)	Iron	(b)	Electric wire
(iii)	Aluminium	(c)	Wrapping food
(iv)	Carbon	(d)	Jewellery
(v)	Copper	(e)	Machinery
(vi)	Mercury	(f)	Fuel



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9. What happens when ,Dilute sulphuric acid is poured on a copper plate ?



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10. Prateek took a piece of burning charcoal and collected the gas evolved in a test tube.

(a) How will he find the nature of the gas?

(b) Write down word equations of all the reactions taking place in this process?



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11. One day Kavita went to a jewellers shop with her mother. Her mother gave an old metal jewellery to the goldsmith to polish. Next day when they brought the jewellery back, they found that there was a slight loss in its weight. Can you suggest a reason for the loss in weight?



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Exercise Mcq S Level 1

1. Which of these elements is used as an antiseptic in medicine ?

A. Carbon

B. Oxygen

C. Nitrogen

D. Iodine

Answer: D



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2. Which of the following does not contain a metallic element ?

A. Sodium chloride

B. Silicon dioxide

C. Magnesium oxide

D. Calcium hydroxide

Answer: B



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3. Bronze is an example of

A. an element

B. a compound of copper and zinc

C. a mixture of copper and zinc

D. a mixture of copper and tin.

Answer: D



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4. A metal dissolved in mercury is called a/an

A. suspension

B. emulsion

C. amalgam

D. solution

Answer: C



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5. Identify the most reactive metal.

A. Iron

B. Gold

C. Zinc

D. Potassium

Answer: D



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6. Which metal does not react with water ?

A. Na

B. Mg

C. Cu

D. Fe

Answer: C



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7. An element X forms an oxide XO which turns red litmus blue. Identify X.

A. A metal

B. A non-metal

C. A metalloid

D. A noble gas

Answer: A



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8. An alloy used in making bodies of aircraft is

A. duralumin

B. steel

C. amalgam

D. solder

Answer: A



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9. The non-metal used in vulcanization of rubber is

A. sulphur

B. carbon

C. phosphorus

D. nitrogen

Answer: A



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10. Which of the following is a non-metal ?

A. Tungsten

B. Mercury

C. Graphite

D. Platinum

Answer: C



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11. A coil of copper wire can be made by pulling a larger piece of copper metal. This is due to which of the following properties of copper ?

A. Malleability

B. Ductility

C. Tensile strength

D. Conductivity

Answer: B



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12. The metals are eaten away when they are exposed to water, oxygen and other chemicals.

What is this process known as ?

A. Oxidation

B. Corrosion

C. Galvanisation

D. Amalgamation

Answer: B



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13. Metal which does not react even with steam is

A. potassium

B. iron

C. magnesium

D. silver.

Answer: D



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14. When steam is passed through zinc then

- A. zinc oxide is formed
- B. zinc hydroxide is formed
- C. hydrochloric acid
- D. water

Answer: A



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15. The metal which is present in brass, bronze and German silver is

A. Mg

B. Zn

C. Cu

D. Al

Answer: C



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16. The metal that forms a self-protecting film of oxide to prevent corrosion is:

A. Cu

B. Al

C. Pt

D. Au

Answer: B



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17. Two metals are melted and mixed together. The resulting mass is cooled to solidify. What is this solid called ?

A. An alloy

B. A non-metal

C. An oxide

D. A mineral

Answer: A



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18. When a metal X is added to dilute HCl solution, there is no evolution of gas. The metal X is

A. K

B. Na

C. Ag

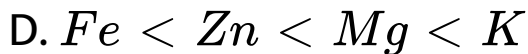
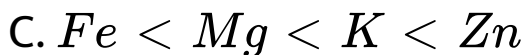
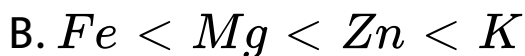
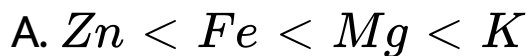
D. Zn

Answer: C



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19. The correct order of increasing chemical reactivity is



Answer: D



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20. Which of the following elements produces basic oxide on reacting with oxygen ?

A. Chlorine

B. Sulphur

C. Phosphorus

D. Magnesium

Answer: D



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21. Copper sulphate solution can be safely kept in a container made of

A. aluminium

B. lead

C. silver

D. zinc

Answer: C



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22. Which of the following metals occurs in free state in nature ?

A. aluminium

B. Calcium

C. Gold

D. Sodium

Answer: C



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23. Which is not a basic oxide ?

A. Sodium oxide

B. Calcium oxide

C. Silicon oxide

D. Iron oxide

Answer: C



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24. Mercury is used in thermometers because

A. it does not stick to the glass

B. It expands on heating

C. it is a liquid

D. all of these

Answer: D



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25. Tungsten is used in electric bulbs because

- A. it is sonorous
- B. it has high melting point
- C. it has high tensile strength
- D. it has high density

Answer: B



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26. Which of the following is not a property of aluminium ?

A. Good conductor of heat and electricity.

B. It is malleable.

C. It is heavy.

D. It is ductile.

Answer: C



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27. When a substance X is hit with a hammer, it expands in size but does not break. This is because the substance is

A. ductile

B. hard

C. elastic

D. malleable.

Answer: D



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28. Non-metals do not conduct electricity because

- A. they have free electrons
- B. they donot have free electrons
- C. they are electron donors
- D. they are electron acceptors.

Answer: B



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29. 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 of the above

Answer: C



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30. Which of the following is not property of a non-metal ?

- A. Forms anions
- B. Forms acidic oxides
- C. High tensile strength
- D. Low density

Answer: C



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Exercise Mcq S Level 2

1. Aluminium is a type of metal that is used to make

- A. wires and bulb filaments
- B. tanks and magnets
- C. drink cans, foil and aeroplanes
- D. food containers and tooth fillings.

Answer: C



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2. The reason(s) why aluminium is preferred over copper for making overhead transmission cables

(i) Aluminium is lighter than copper

(ii) aluminium is harder than copper

(iii) aluminium is less soluble in water than copper.

A. Only (i)

B. Only (iii)

C. Only (i) and (ii)

D. (i), (ii) and (iii)

Answer: A



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3. Gravity separation method is based upon:

A. preferential washing of ores and gangue particles

B. difference in densities of ore particles and impurities.

C. difference in chemical property of ore particles and impurities.

D. none of these

Answer: B



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4. A copper coin is kept immersed in a solution of silver nitrate for some time. What will happen to the coin and the colour of the solution?

A. Silver metal will be deposited on coin and solution will turn blue.

B. Solution will remain colourless and coin will turn blue.

C. Both solution and the coin will turn blue.

D. Both solution and the coin will become colourless.

Answer: A



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5. 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. $CuSO_4$ solution and zinc metal

Answer: D



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6. An unknown metal X when placed in copper sulphate solution gives a red brown deposit. When placed in magnesium sulphate solution, gives no reaction. Identify element X.

A. Sodium

B. Potassium

C. Calcium

D. Iron

Answer: D



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7. In the process of welding metals like stainless steel and aluminium

A. oxyacetylene flame is used

B. liquid helium is used

C. liquid oxygen is used

D. liquid nitrogen is used.

Answer: A



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8. Which of the following metals on reaction with sodium hydroxide solution produce hydrogen gas ?

1. Cu

2. Al

3. Fe

4. Zn

A. 2 and 3

B. 2 and 4

C. 1 and 4

D. 2 only

Answer: B



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9. Match the following.

Column I

(P) Sodium

(Q) Phosphorus

(R) Copper

(S) Charcoal

Column II

(1) On burning produces an acidic gas

(2) Reacts neither with acids nor with bases

(3) It is so soft that it can be cut with a knife

(4) Burns spontaneously on exposure to air

(5) Acquires a dull green coating on exposure to air

Which of the following shows the correct matching ?

A. P-3,Q-5,R-2,S-1

B. P-4,Q-1,R-3,S-2

C. P-4,Q-5,R-3,S-2

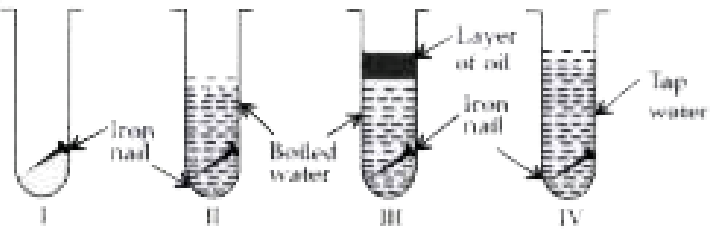
D. P-3,Q-4,R-5,S-1

Answer: D



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10. In which test tubes, the rusting of iron nail will take place ?



A. I and IV

B. I, II and IV

C. II and III

D. II, III and IV

Answer: B



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11. Match the items in column I with column II

Column-I (Ore)	Column-II (Metals to be extracted)
(P) Haematite	(1) Ca
(Q) Bauxite	(2) Hg
(R) Gypsum	(3) Fe
(S) Cinnabar	(4) Al



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12. A highly reacting element X is stored under water. It readily reacts with oxygen of air to give a compound Y which dissolves in water. The aqueous solution of Y changes blue litmus solution to red. The element X is

A. sodium

B. Sulphur

C. phosphorus

D. Potassium

Answer: C



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13. Two elements A and B on burning in air give corresponding oxides. Oxides of both A and B are soluble in water. The aqueous

solution of oxide of A is alkaline and reacts with aqueous solution of oxide of B to give another compound. Identify A and B

- A. A and B both are metals
- B. A and B both are non-metals
- C. A is metal and B is non-metal
- D. A is non-metal and B is metal

Answer: C



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14. Metallurgy is a process of extracting

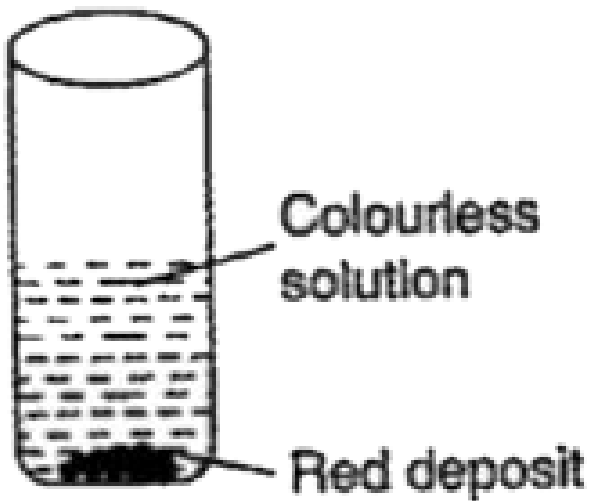
- A. metal from its mineral
- B. metal from its ore
- C. pure metall from its ore
- D. metal from its pure ore

Answer: C



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15. When few granules of sample X are added to a solution of copper sulphate, the changes observed are shown in the figure.



Identify sample X and red deposit.

A. Fe, Zn

B. Zn, Cu

C. Cu, Zn

D. Fe, Cu

Answer: B



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16. Choose the reactions which are not feasible.

I. Iron+Zinc sulphate \rightarrow Iron sulphate+Zinc

II. Magnesium+Silver nitrate \rightarrow Magnesium nitrate+Silver

III. Copper+dil. Sulphuric acid \rightarrow Copper sulphate+Hydrogen

IV. Zinc+Ferrous sulphate \rightarrow Iron+Zinc sulphate

A. I, II and III

B. III and IV only

C. I and III only

D. I, II, III and IV

Answer: C



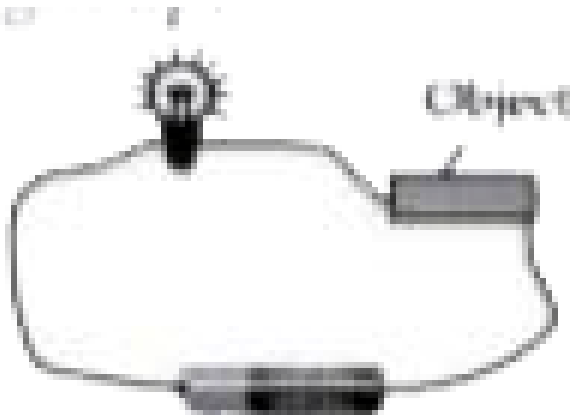
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17. Meenu sets up an electric circuit as shown in the figure by using copper wire. She repeated the experiment with:

I → Aluminium foil, *II* → Iron nail,

III → Coal, *IV* → Graphite

In which cases the bulb will light up ?



A. I and II only

B. II and IV only

C. I, II and IV

D. I,II,III and IV

Answer: C



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18. Study the table carefully and select the appropriate option.

Sample	Conductor of electricity	Malleability	Lustrous
W	✓	✓	✓
X	✓	✗	✓
Y	✓	✗	✓
Z	✗	✗	✓

A. W-Potassium, X-Sodium, Y-Graphite, Z-

Aluminium

B. W-Graphite, X-Aluminium, Y-Potassium, Z-

Potassium

C. W-Sodium, X-Aluminium, Y-Potassium, Z-

Graphite

D. W-Aluminium, X-Sodium, Y-Graphite, Z-

Iodine

Answer: D



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19. Some materials like magnesium ribbon, aluminium foil, copper wire and charcoal (powder) were taken in different test tubes labelled as P, Q, R and S. 5 mL of dilute hydrochloric acid was added to each test tube. When a burning matchstick is brought near the mouth of each test tube, in which cases pop sound would be heard ?

A. Only P

B. Only P and Q

C. Only Q and S

D. Only P, Q and R

Answer: B



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20. Extraction of highly electropositive metal is done by

A. electrolysis of aqueous solution of metal chloride

B. electrolysis of molten metal chloride

C. carbon reduction of the oxide of the metal

D. strongly heating the oxide of the metal

Answer: B



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Exercise Match The Following

1. Match the following columns

List-I

(P) Aircrafts

(Q) Utensils

(R) Medals

(S) Balance beam

List-II

1. Stainless steel

2. Bronze

3. Magnalium

4. Duralumin

A. P-3,Q-4,R-2,S-1

B. P-3,Q-1,R-2,S-4

C. P-4,Q-1,R-2,S-3

D. P-4,Q-3,R-1,S-2

Answer: C



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2. Match the following columns

List-I

(P) Metallic oxide

(Q) Phosphorus

(R) Non-metallic oxide

(S) Sodium

List-II

1. Turns blue litmus red

2. Kept in kerosene 3

3. Basic in nature

4. Kept in water

A. P-2,Q-3,R-4,S-1

B. P-4,Q-3,R-2,S-1

C. P-3,Q-4,R-2,S-1

D. P-3,Q-4,R-1,S-2

Answer: D



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3.

List-I

(P) CuSO_4 solution

(Q) FeSO_4 solution

(R) ZnSO_4 solution

(S) I_2 solution

List-II

1. Colourless

2. Purple

3. Light green

4. Blue

A. P-3,Q-4,R-1,S-2

B. P-4,Q-3,R-1,S-2

C. P-4,Q-1,R-2,S-3

D. P-3,Q-2,R-4,S-1

Answer: B



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4. Match the following columns

4.	List-I	List-II
	(P) The property of making resonating sound	1. Ductility
	(Q) The property to be drawn into wires	2. Malleability
	(R) The property to be beaten into sheets	3. Sonority
	(S) The property to withstand the longitudinal pull	4. Tensile strength



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5. Match the following columns

(P) Iron oxide

List-I

(P) Iron oxide

(Q) Noble metal

(R) Sulphur dioxide

(S) Mercury

(1) Liquid metal

List-II

1. Liquid metal

2. Acidic oxide

3. Gold

4. Basic oxide



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Exercise Assertion Reason Type

1. Assertion: Iron is found in free state in nature.

Reason: Iron is not highly reactive metal.



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2. Assertion: Zinc is used in galvanisation of iron.

Reason: Its coating on iron articles increases their life by protecting them from rusting.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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3. Assertion: Copper cannot displace hydrogen from acids.

Reason: It lies above hydrogen in the reactivity series.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C



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4. Assertion : Aluminium appears dull in colour and does not react with water, acids or alkalies.

Reason: It has a protective layer of oxide on it.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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5. Assertion : If a piece of copper is placed in silver nitrate solution, the solution becomes blue.

Reason : Displacement reaction takes place and copper goes into the solution.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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6. Assertion : On beating with the help of a hammer, coal is converted into small pieces and finally into a powder.

Reason : Coal is made up of carbon which is malleable in nature.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C



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7. Assertion : Most of the metals can be beaten into sheets.

Reason : Most of the metals are ductile.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B



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8. Assertion : Graphite is a non-metal.

Reason : It is the only non-metal which is good conductor of electricity.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B



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9. Assertion : A solution of carbon dioxide in water turns red litmus blue.

Reason : Carbon dioxide is basic oxide.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: D



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10. Assertion : Copper and aluminium are used to make electric wires.

Reason : Copper and aluminium are good conductors of electricity.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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Exercise Comprehension Type

1. The decay of metals by atmospheric oxygen and moisture is called corrosion. Few metals

do not react with atmospheric gases and water and do not undergo corrosion, while others develop a dull layer on them or a coloured layer to spoil their shiny appearance or turn black or are converted into powder. few elements, on the other hand are protected due to presence of this dull layer of oxide on them.

Q. Aluminium does not react readily with air or water because

A. it occupies high position in electrochemical series.

B. it lies below hydrogen in electrochemical series

C. it is covered with a layer of oxide which does not rub off.

D. it is a noble metal

Answer: C



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2. The decay of metals by atmospheric oxygen and moisture is called corrosion. Few metals do not react with atmospheric gases and water and do not undergo corrosion, while others develop a dull layer on them or a coloured layer to spoil their shiny appearance or turn black or are converted into powder. few elements, on the other hand are protected due to presence of this dull layer of oxide on them.

Q. Iron reacts with air in presence of water and

forms a brown powder which is called rust.

chemically rust is

- A. iron oxide
- B. hydrated iron oxide
- C. iron sulphate
- D. iron carbonate

Answer: B



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3. The decay of metals by atmospheric oxygen and moisture is called corrosion. Few metals do not react with atmospheric gases and water and do not undergo corrosion, while others develop a dull layer on them or a coloured layer to spoil their shiny appearance or turn black or are converted into powder. few elements, on the other hand are protected due to presence of this dull layer of oxide on them.

Q. Silver metal on exposure to air for a long

time becomes black in colour. what is the reason behind it ?



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4. The decay of metals by atmospheric oxygen and moisture is called corrosion. Few metals do not react with atmospheric gases and water and do not undergo corrosion, while others develop a dull layer on them or a coloured layer to spoil their shiny appearance or turn black or are converted into powder.

few elements, on the other hand are protected due to presence of this dull layer of oxide on them.

Q. The green layer developed on copper on exposure to air is due to

- A. copper carbonate layer
- B. basic copper carbonate layer
- C. copper sulphate layer
- D. copper nitrate layer.

Answer: B



5. Certain metals have the capacity to displace some metals from their salt solutions. These reactions are known as metal displacement reactions. A metal placed higher in activity series can displace the metal occupying lower position from aqueous solution of its salt or a more reactive metal can displace less reactive metal from its salt solution.

Q. If a zinc rod is dipped in copper sulphate solution, following changes will be noticed.

mark the correct observations.

(i) Zinc rod slowly loses its weight.

(ii) Copper settles at the bottom of the beaker.

(iii) Blue colour of copper sulphate disappears.

A. (i) and (ii) only

B. (i), (ii) and (iii) only

C. (i) and (iii) only

D. (iii) only

Answer: B



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6. Certain metals have the capacity to displace some metals from their salt solutions. These reactions are known as metal displacement reactions. A metal placed higher in activity series can displace the metal occupying lower position from aqueous solution of its salt or a more reactive metal can displace less reactive metal from its salt solution.

Q. Take aqueous solution of copper sulphate in one test tube and ferrous sulphate in another test tube. dip an iron nail in copper

sulphate and copper wire in ferrous sulphate solution. mark the correct observation.

A. Blue colour in first test tube changes to light green and green in the second test tube changes to blue

B. There is no reaction in both the test tubes.

C. Blue colour in first test tube changes to light green and no change in second test tube

D. Blue colour remains as such and green colour in second test tube changes to blue

Answer: C



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7. Certain metals have the capacity to displace some metals from their salt solutions. These reactions are known as metal displacement reactions. A metal placed higher in activity

series can displace the metal occupying lower position from aqueous solution of its salt or a more reactive metal can displace less reactive metal from its salt solution.

Q. The above observations show that

A. copper is present above iron in the reactivity series

B. iron is present above copper in the reactivity series

C. both iron and copper are present above hydrogen in the reactivity series

D. reactivity series does not decide reactivity of the metals.

Answer: B



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8. Certain metals have the capacity to displace some metals from their salt solutions. These reactions are known as metal displacement reactions. A metal placed higher in activity series can displace the metal occupying lower

position from aqueous solution of its salt or a more reactive metal can displace less reactive metal from its salt solution.

Q. Displacement reactions are shown by

A. metals only

B. non-metals only

C. both metals and non-metals

D. all the elements.

Answer: A



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9. Metals and non-metals react with oxygen to give oxide are basic in nature while oxides formed by non-metals are acidic in nature. The nature of oxides can be determined by testing the aqueous solution of oxide with litmus paper.

Q. The oxides of non-metals are acidic oxides because they dissolve in water to give ____

A. alkalies

B. acids

C. carbonates

D. sulphates.

Answer: B



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10. Metals and non-metals react with oxygen to give oxide are basic in nature while oxides formed by non-metals are acidic in nature. The nature of oxides can be determined by testing the aqueous solution of oxide with litmus

paper.

Q. Phosphorus is burnt in air to give phosphorus pentoxide. it is dissolved in water and tested with litmus paper. mark the correct observation.

A. Red litmus paper turns blue

B. Blue litmus paper turns red

C. There is no change in the litmus paper

D. Red litmus paper changes to green

Answer: B



11. Metals and non-metals react with oxygen to give oxide are basic in nature while oxides formed by non-metals are acidic in nature. The nature of oxides can be determined by testing the aqueous solution of oxide with litmus paper.

Q. Magnesium ribbon on burning in air gives a white powder which when dissolved in water turns red litmus blue. the reason for this change is that

- A. MgO is a basic oxide
- B. MgO is an acidic oxide
- C. MgO is a very reactive oxide
- D. MgO is not a reactive oxide

Answer: A



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12. Metals in general have a tendency to evolve hydrogen gas on reacting with acids. In the activity series the metals that are placed

above hydrogen evolve the gas on reaction with acids while the metals placed below hydrogen do not evolve the gas on reaction with acids. these metals are regarded as inactive metals. metals placed at the bottom of the series are called noble metals.

Q. Which metal would not produce bubbles of hydrogen gas when added to dilute hydrochloric acid ?

A. Magnesium

B. Sodium

C. Iron

D. Silver

Answer: D

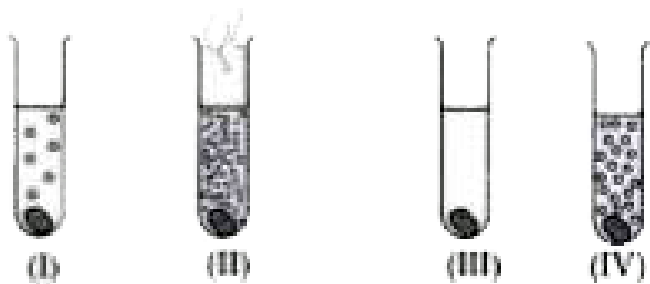


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13. Metals in general have a tendency to evolve hydrogen gas on reacting with acids. In the activity series the metals that are placed above hydrogen evolve the gas on reaction with acids while the metals placed below hydrogen do not evolve the gas on reaction

with acids. these metals are regarded as inactive metals. metals placed at the bottom of the series are called noble metals.

Pieces of copper, lead, aluminium and zinc are added to dilute hydrochloric acid. which of the following test tubes most likely contains zinc ?



A. (I)

B. (II)

C. (III)

D. (IV)

Answer: D

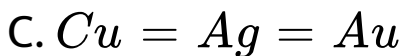
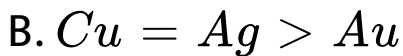
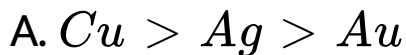


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14. Metals in general have a tendency to evolve hydrogen gas on reacting with acids. In the activity series the metals that are placed above hydrogen evolve the gas on reaction with acids while the metals placed below hydrogen do not evolve the gas on reaction

with acids. these metals are regarded as inactive metals. metals placed at the bottom of the series are called noble metals.

Q. Silver and gold do not react with oxygen even at very high temperature while copper reacts on prolonged heating. the reactivity of these metals is



Answer: A



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Exercise Subjective Problems Very Short Answer Type

1. Elements which possess characters of both metals and non-metals are called ____ .



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2. A reaction in which a more active metal displaces a less active metal from the solution of its salt is called a ____ reaction.



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3. What is galvanization ?



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4. Give reason:

Aluminium is a highly reactive metal, yet it is used to make utensils for cooking



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5. What is rust chemically known as ?



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6. What happens when a solution of metal oxide is tested with (i) blue litmus and (ii) red litmus ?



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7. Compare the changes taking place in an iron piece and a wood log on heating with a hammer.



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8. List four physical properties of metals. Name two metals. Name a metal which is liquid at room temperature.



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9. Explain why aluminium metal can displace copper from copper sulphate solution but copper cannot displace aluminium from aluminium sulphate solution ?



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10. Why are metals good conductors of electricity ?



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11. Write equation for the reaction of iron with steam.



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12. Arrange Na, Mg , Fe, Pb , Hg and Cu in order of decreasing reactivity.



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13. What is the most common property of the metals lying at the top of the reactivity series ?



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14. What is an amalgam ?



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15. In what respect does graphite resemble a metal ?



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Exercise Subjective Problems Short Answer Type

1. Complete the given table about properties of metals.

Property	Meaning
(a)	Can be beaten into thin sheets
(b)	Can be pulled into wires
(c)	Gives a ringing sound when hit
(d)	Has a shiny appearance



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2. For the following questions, choose answers from the list of elements-mercury, carbon, hydrogen, tin, sulphur, bromine, magnesium, silicon.

(a) Which of the elements are solids ?

(b) Which of the elements are liquids ?

(c) Which of the elements are gases ?

(d) Which of the elements are metals ?

(e) Which of the elements are non-metals ?



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3. What happens when a magnesium ribbon is heated in presence of air?



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4. List few important uses of metals.



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5. What will happen if you drop

(a) some pieces of magnesium ribbon into blue copper sulphate solution ?

(b) some tin pieces into green ferrous sulphate solution ?



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6. Gold, platinum and silver are used to make jewellery. Give reasons.



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7. Why do some metals acquire a dull appearance on exposure to air for a long time ?



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8. Give reasons why metals are good conductors, whereas nonmetals do not.



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9. Why are some metals light in weight? Give examples of few light metals.



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10. Arrange the metals K, Na and Ca in decreasing order of reactivity on the basis of reaction with water.



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11. How do alloys brass and bronze differ in composition ?



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12. Aluminium metal is not as reactive as expected. Why ?



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13. Which of the following metals will give hydrogen with dilute hydrochloric acid ?

Fe, Cu, Mg



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14. Name the alloy of lead used in joining metals for electrical work.



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15. Name the alloy of copper which is used in making utensils and vessels.



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Exercise Subjective Problems Long Answer Type

1. Two properties of four substances A, B, C and D are given in the table.

Substance	Melting point (°C)	Electrical conductivity	
		Solid	Molten form
A	1100	Good	Good
B	1234	Poor	Good
C	2027	Poor	Poor
D	15	Poor	Poor

Which of these substances is most likely a metal and why?



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2. Identify the non-metals on the basis of their uses:

- (i) Non-metal essential for all living beings.
- (ii) Non-metal used in fertilizers to enhance growth of plants.
- (iii) Non-metal used in water purification process.
- (iv) Non-metal used in purple coloured solution which is applied on wounds and used as an antiseptic.
- (v) Non-metal used in crackers.



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3. What are the harmful effects of corrosion ?

Mention a type of corrosion which is helpful to the metal.



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4. Define displacement reaction. An iron knife kept in blue copper sulphate solution turns the blue solution into light green. Explain.



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5. With a suitable activity show that sulphur burns in air to form a compound which is acidic in nature.



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Exerciseinteger Numerical Value Type

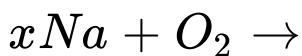
1. Number of metals which lie above hydrogen out of the following is

Sodium, lead, copper, platinum, zinc, mercury.



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2. In the following reaction, x is



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3. Number of elements which form basic oxide is Magnesium, aluminium, carbon, sulphur, iron, potassium, zinc.



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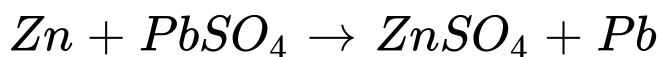
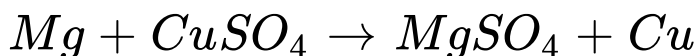
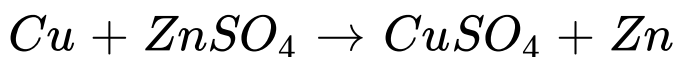
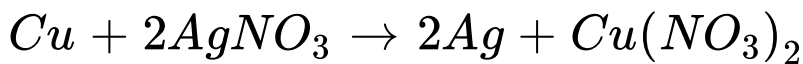
4. Number of elements which will not react even with boiling water is

Sodium, iron, zinc, copper, magnesium, silver.



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5. Number of possible reactions out of the following is

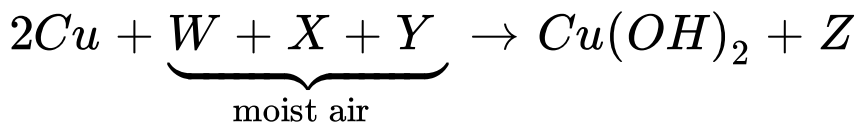




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Olympiad Hots Corner

1. When a copper vessel is exposed to moist air for long, it acquires a dull green coating. The reaction can be represented as



W,X,Y and Z respectively



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2. Ms. Deepika, a science teacher demonstrated an activity in the science lab and the experiment was set up as shown in the figure.



The metal 'X' reacts with steam to form a gas 'Y' which is collected into the syringe.

Which of the following best describes the metal 'X' and gas 'Y' ?

A. Metal 'X' is silver and gas 'Y' is hydrogen which burns with a pop sound.

B. Metal 'X' is sodium and gas 'Y' is carbon dioxide which gives white precipitate with lime water.

C. Metal 'X' is iron and gas 'Y' is hydrogen which burns with a pop sound.

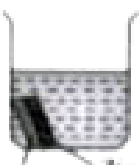
D. Metal 'X' is magnesium and gas 'Y' is carbon dioxide which gives white precipitate with lime water.

Answer: C

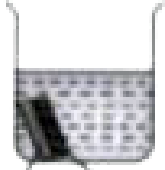


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3. Each beaker shown in the given options, contains two same sizes strips of different metals fastened together and immersed in hydrochloric acid. After 5 minutes, which beaker will contain the least amount of zinc ions ?



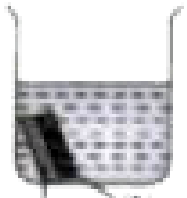
A. Magnesium Zinc



B. Lead Zinc



C. Iron Zinc

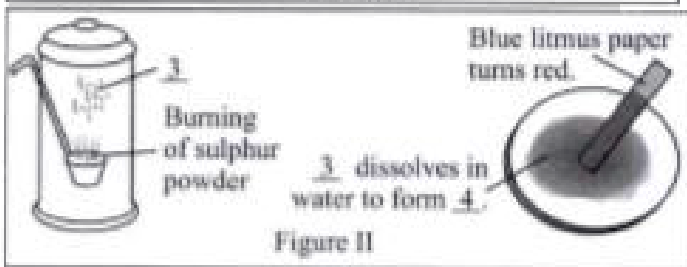
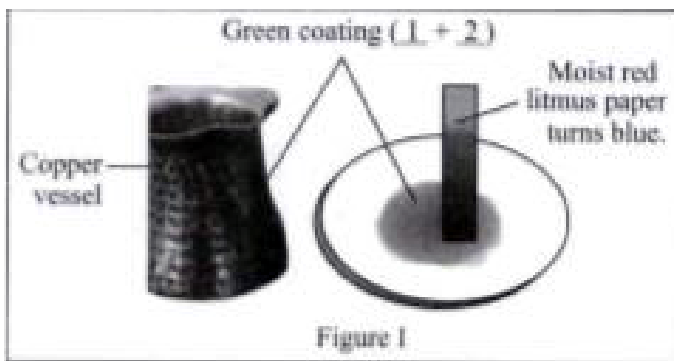


D. Silver Zinc

Answer: A



4. A copper vessel exposed to moist air for a long time is shown in figure I and sulphur powder is burnt in oxygen as shown in figure II.



1,2,3 and 4 are respectively.

A. CuO , CO_2 , SO_2 , H_2SO_3

B. $CuCO_3$, $Cu(OH)_2$, H_2SO_3 , SO_2

C. Cu , CuO , H_2S , H_2SO_4

D. $Cu(OH)_2$, $CuCO_3$, SO_2 , H_2SO_3

Answer: D

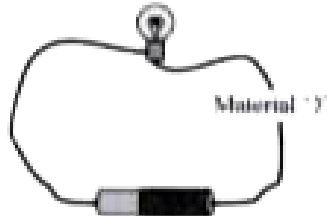
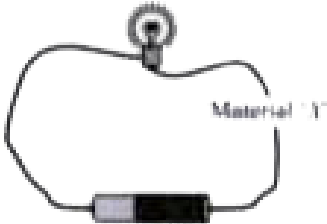


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5. Rohit has performed an activity to test whether the following materials conduct electricity or not by putting them in the

circuit, one at a time as shown in the figure.

Materials		
Aluminium foil (1)	A piece of stone (2)	Copper wire (3)
Graphite (4)	Sulphur (5)	Silver coin (6)



Materials X and Y could be

- A. X-1,3,4,6, Y-2,5
- B. X-1,5,6, Y-2,3,4
- C. X-1,3,6, Y-2,4,5
- D. X-2,3,4,5, Y-1,6

Answer: A



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6. Find the incorrect match.

A. Haemoglobin-Magnesium

B. Fertilisers-Nitrogen and phosphorus

C. Chlorophyll-Iron

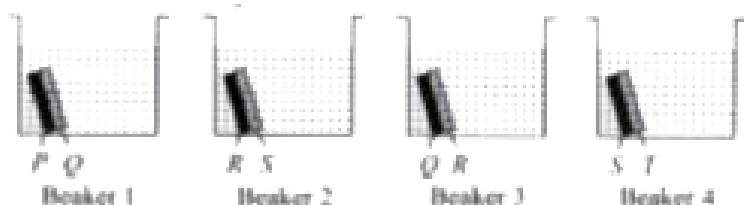
D. Both (a) and (c)

Answer: D



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7. Each of the given beakers contains two metal strips of same size fastened together and immersed in in hydrochloric acid.



After 5 minutes, amount of Q ions formed is greater than P ions in beaker 1, S ions is greater than R ions in beaker 2, R ions is greater than Q ions in beaker 3, and T ions is greater than S ions in beaker 4.

Correct order of reactivity of these metals is

A. $P > Q > R > S > T$

B. $R < P < T < S < Q$

C. $T > R > Q > P > S$

D. $P < Q < R < S < T$

Answer: D



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8. Read the table carefully.

S. No.	Reaction	Product formed	Characteristic test
1.	Copper vessel exposed to moist air	Green coating	Turns red litmus solution blue
2.	Aluminium foil dipped in fresh solution of sodium hydroxide	Colourless, odourless gas	Burns with a pop sound
3.	Rusting of iron	Reddish brown deposit	Turns red litmus solution blue
4.	Burning of sulphur powder	Colourless, suffocating gas	Turns blue litmus solution red

Identify the products formed and their nature.

A. (1) $Cu(OH)_2$, $CuSO_3$, basic

(2) H_2 , neutral

(3) Fe_2O_3 , basic

(4) SO_2 , acidic

B. (1) CuO , basic

(2) O_2 , neutral

(3) Fe_3O_4 , basic

(4) H_2S , acidic

C. (1) $Cu(HO)_2 \cdot CuCO_3$, basic

(2) H_2 , neutral

(3) Fe_2O_3 , acidic

(4) SO_2 , basic

D. (1) Cu , basic

(2) H_2O , neutral

(3) FeO , basic

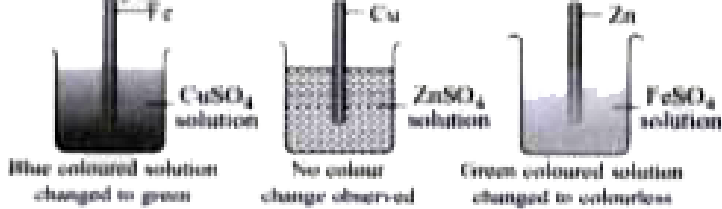
(4) SO_3 , basic

Answer: A



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9. Neha, a class VIII student arranged the following experimental set-up and observed the changes carefully.



On the basis of her observations identify the correct order of reactivity.



Answer: B



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10. Namita categorised the different elements as shown below:

	Characteristic	Na	Al	S	Fe	Cu	P
(i)	Metal	✓	✓	✗	✓	✓	✗
(ii)	Hardness	✓	✗	✗	✓	✓	✗
(iii)	Malleability	✗	✓	✗	✗	✓	✓
(iv)	Ductility	✗	✗	✓	✓	✓	✗
(v)	Conductor of electricity	✓	✓	✗	✓	✓	✗

Which of the characteristics is not correctly matched by Namita ?

- A. (i), (iii) and (v)
- B. (i), (ii), (iv) and (v)
- C. (ii), (iii) and (iv)

D. (i), (ii), (iii), (iv) and (v)

Answer: C



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11. Match the column I with column II and choose the correct option using the codes given below.

Column I

- (P) Used in thermometers
- (Q) Present in fertilisers
- (R) Used to disinfect water
- (S) Used as an antiseptic

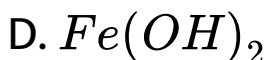
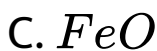
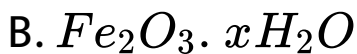
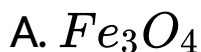
Column II

- (1) Iodine
- (2) Mercury
- (3) Phosphorus
- (4) Chlorine



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12. Any article of iron if left in open for some time, acquires a film of brownish substance (rust) having chemical formula ____



Answer: B



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13. Few uses of metals are shown below. ,br>



Identify the properties which are responsible for the uses X, Y and Z respectively.

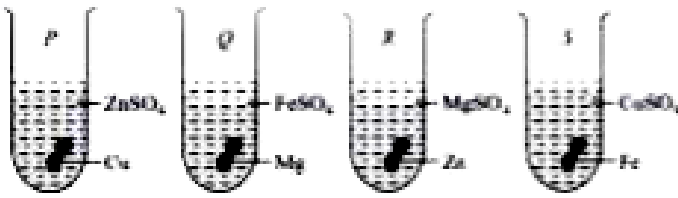
- A. Conductivity, Malleability, Ductility.
- B. Ductility, Malleability, Sonorous
- C. Sonorous, Malleability, Ductility
- D. Malleability, Ductility, Sonorous

Answer: D



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14. A student performed the first set of experiments with four test tubes containing solutions and metal pieces as indicated in the figure. In the second set of experiments, the metal pieces are interchanged between test tubes P and Q and also between test tubes R and S.



In which test tube(s), no reaction will occur in both sets of experiments ?

- A. P and Q
- B. R
- C. S
- D. R and S

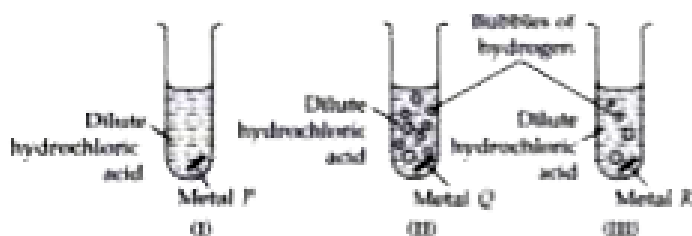
Answer: B



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15. The given diagrams show the reactions of three metals with dilute hydrochloric acid.

What are metals P, Q and R?



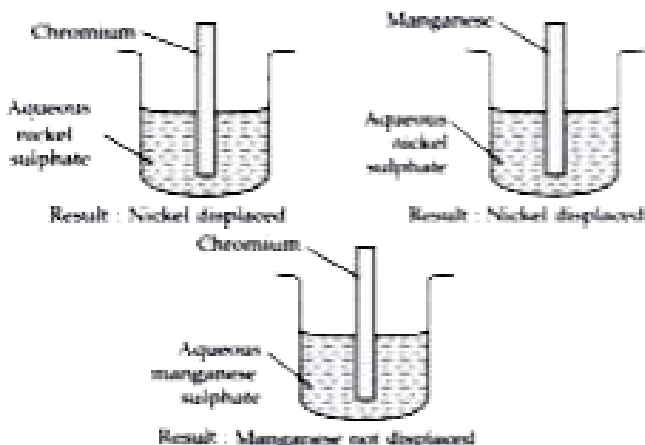
- A. P-Copper, Q-Magnesium, R-Zinc
- B. P-Copper, Q-Zinc, R-Magnesium
- C. P-Magnesium, Q-Zinc, R-Copper
- D. P-Zinc, Q-Magnesium, R-Copper

Answer: A



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16. Three experiments to investigate the reactivities of three metals are shown as:



What is the correct order of reactivity (most

reactive \rightarrow least reactive) for these three metals ?

A. Chromium, Manganese, Nickel

B. Manganese, Chromium, Nickel

C. Manganese, Nickel, Chromium

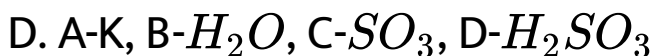
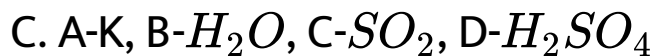
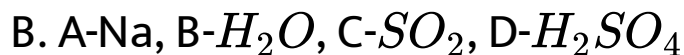
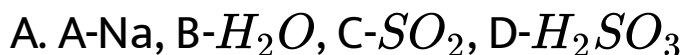
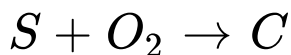
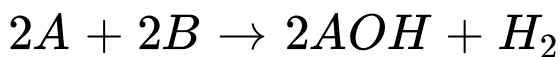
D. Nickel, Chromium, Manganese

Answer: B



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17. Identify A, B, C and D in the given sequence of reactions.

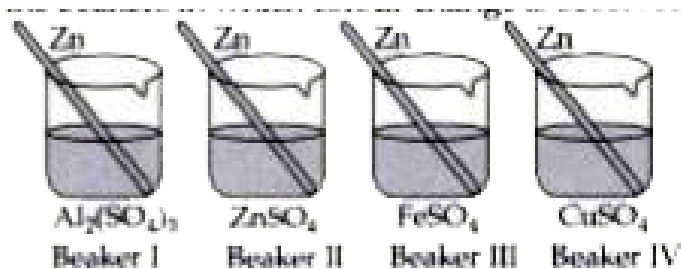


Answer: A



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18. Ritika noted the initial colour of the solutions in beakers I, II, III and IV. After inserting zinc rods in each solution and leaving undisturbed for two hours, she noted the colour of each solution again. Mark the beakers in which colour change is observed ?



A. I and II only

B. II and III

C. III and IV

D. I and IV

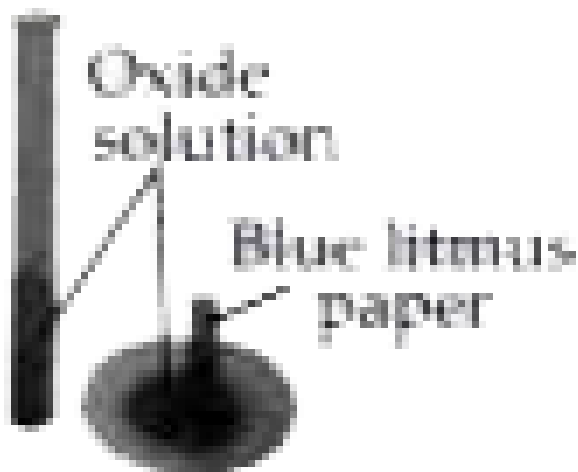
Answer: C



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19. Samples of four different oxides were taken and dissolved in water separately to form the respective oxide solution. The four solutions

were then tested for their acidic/basic nature. When dissolved in water, which of the following oxides, is likely to turn blue litmus red ?



A. SO_2

B. MgO

C. Fe_2O_3

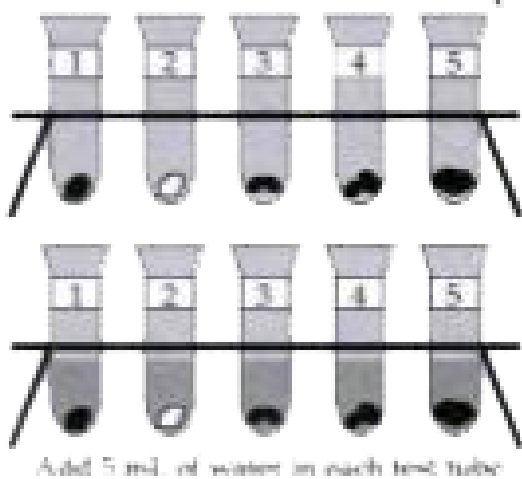
D. CaO

Answer: A



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20. Mona tries an experiment with five different metals namely sodium, magnesium, zinc, iron and copper taken in five different test tubes respectively.



Mona observed that hydrogen gas is evolved in test tube 3, only when it was boiled. test tube 3 contains only ____

A. Zn

B. Na

C. Mg

D. Cu

Answer: A



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