

Sub. : Science	Answer Paper	Marks: 30	
Std. : X th - CBSE	3. Metals and non metals.	Time : 1 Hour.	
	SECTION (A)	(Each - 1 Mark)	
Q.1: Name the ore of alum	inium.		
Ans. : Bauxite is an ore of aluminium			
OR			
Which of the following represent the correct order of decreasing reactivity?			
Ans. : a) $Mg > Al > Zn > Fe$			
Q.2 : Define alloy.			
Ans. : An alloy is a homogene	eous mixture of two or more metals or a m	etal and a nonmetal.	
OR			
Give two examples o	f amphoteric oxides.		
Ans. : Aluminium oxide and z	inc oxide.		
Q.3: Assertion (A): Brass is an alloy of zinc and magnesium.			
Ans d) A is false but R is to	e homogenous mixture of two or more m	etals.	
O.4: Assertion (A): Different metals have different reactivities with water and dilute acids.			
Reason (B) : Reactivity of a metal depends on its position in the reactivity series.			
Ans. : a) Both A and R are true, and R is correct explanation of the assertion.			
Q.5: Assertion (A): Iron is the most widely used metal. But it is never used in its pure state.			
Reason (R): Pure iron is very soft and stretches easily when hot.			
Ans. : a) Both A and R are true, and R is correct explanation of the assertion.			
Ans. : d) Aqua regia.			
1	OR		
Hematite is an ore of			
Ans. : a) Iron			
Q.7: Read the following and answer any two question from 5(i) to 5(iii). (2 Mark)			
An ore on treatme	nt brisk effervensces.		
i) What type of ore is the	his?		
Ans. : d) Carbonate			
ii) By which process the metal is obtained?			
Ans. : b) Calcination			
iii) This type of ore is he	eated in.		

Ans. : c) In absence of air

Q.8 : Which one of the following properties is not generally exhibited by ionic compounds?

Ans. :b) Electrical conductivity in solid state

Q.9: Which of the following non-metal is lustrous?

Ans. :d) Iodine

Q.10: An element X is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following

Ans. :b) Na

Q.11: Reaction between X and Y forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?

Ans. :c) Conducts electricity in molten state

Q.12: The ability of metals to be drawn into thin wires is known as

Ans. :a) ductility

Q.13: The electronic configurations of three elements X, Y and Z are X - 2, 8; Y - 2, 8, 7 and Z - 2, 8, 2. Which of the following is correct?

Ans. :d) Y is a non-metal and Z is a metal.

Q.14 :The atomic numbers of four elements A, B, C and D are 6, 8, 10 and 12 respectively. The two elements which can react to form ionic bonds (or ionic compound) are:

Ans. :d)B and D

SECTION (B)

(Each - 2 Mark)

Q.15: Define amphoteric oxides.

Ans. : The oxides which shows the properties of both basic as well as acidic oxides is called as amphoteric oxides.

OR

Define corrosion.

Ans. : The surface of some metals such as iron is corroded when they are exposed to moist air for a long period of time. This phenomenon is known as corrosion.

Q.16: What is meant by aqua regia? Which metal is dissolved in aqua regia?

Ans. : Aqua regia is freshly prepared mixture of concentrated hydrochloric acid and concentrated nitric acid in the ratio 3 : 1.

Gold is the metal which is dissolved in aqua regia.

SECTION (C)

(Each - 3 Mark)

Q.17: 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 fig.



- : Name two metals which react violently with cold water. Write any observation you would make when such a metal is dropped into water. How would you identify the gas evolved, if any, during the reactions?
- Ans. : Metals which react violently with cold water are potassium (k) and Sodium (Na).

 $2K + 2H_2O \rightarrow 2KOH + H_2 + Heat energy$

 $2Na + 2H_2O \rightarrow 2NaOH + H_2 + Heat energy$

The hydrogen gas produced during the reactions of these two metals with water immediately catches fire. Thus, these reactions are violent and exothermic.

The gas evolved during these reactions burns with a popping sound which confirms that the gas is hydrogen (H_2) .

Q.18: What is cinnabar? How is metal extracted from cinnabar? Explain briefly.

Ans. : Cinnabar is HgS

Mercury is obtained by roasting cinnabar.

HgO formed is thermally unstable and gives mercury.

$$2HgS_{(s)} + O_{2(g)} \longrightarrow HgO_{(s)} + SO_{2(g)}$$

$$HgO_{(s)} \longrightarrow Hg_{(l)} + O_{2(g)}$$

 $HgS + O_2 \longrightarrow Hg + SO_2$

Mercury can be purified by distillation.

SECTION (D)

(5 Mark)

Q.19: Metal M is the most abundant metal in the Earth crust. Its electronic configuration is 2, 8, 3 and occurs in the Earth crust as its oxides M₂O₃. Name the ore of the metel

containing M₂O₃. Explain the method used for concentration of the ore. Also give reason for choosing that method.

Ans. : Since electronic configuration is 2, 8, 3, atomic no. of the metal is 13. As it is the most abundant metal in the earth's crust the metal 'M' is aluminium (Al).

The ore of the metal containing M_2O_3 is Bauxite Al_2O_3 . $2H_2O_3$.

The method used for concentration of the ore is chemical separation method. This method is suitable because Al is a very reactive metal. This method is based on the difference in chemical reactivity of ore and gangue. This method is also known as Bayer's method.

i) The powdered Ore is treated with hot conc. NaOH solution.

 $\begin{array}{ll} Al_2O_3(s) + 2NaOH(aq) \rightarrow 2NaAlO_2 + H_2O(\ell) \\ (from & Sodium \\ bauxite ore) & Aluminate \\ (watar Soluble) \end{array}$

Impurities do not react with NaOH and are separated by filtration.

ii) The filterate containing sodium aluminate is diluted with water to obtain a precipitate of aluminium hydroxide.

 $NaAlO_2 + 2H_2O \rightarrow Al(OH)_3(s) + NaOH(aq)$

iii) The precipitate is washed, dried and heated to give pure alumina.

 $2Al(OH)_3 \xrightarrow{\text{Stong heating}} Al_2O_3 + 3H_2O(g)$ Water Vapours.

OR

: i) How do you classify elements into metals and non-metals on the basis of their electronic configuration? Choose metal and non-metal out of the following :

 $^{23}_{11}$ A, $^{19}_{9}$ B, $^{24}_{12}$ C, $^{31}_{15}$ D, $^{35}_{17}$ E

- ii) What type of bond will be formed if
 - a) 'A' combines with 'B'
 - b) 'A' combines with 'E'

c) 'C' combines with 'E'

d) 'D' combines with 'E'

Ans. : i) Elements which contain 1 to 3 electrons in their outermost shells are metals. Elements containing 4 to 7 electrons in their valence shell are non-metals.

Electronic configuration :

$^{23}_{11}A$	(Z = 11)	= 2, 8, 1
${}_{9}^{19}{ m B}$	(Z = 9)	= 2,7
$^{24}_{12}{ m C}$	(Z = 15)	= 2, 8, 2
$^{31}_{15}D$	(Z = 15)	= 2, 8, 5
$^{35}_{17}{ m E}$	(Z = 17)	=2, 8, 7

Hence A and C are metals whereas B, D and E are non-metals.

ii) Type of bonds

a) 'A' is metal and B is non-metal, so the bond formed will be ionic.



Ionic Bond

b) A is metal and E is non-metal, So the bond formed is ionic.



c) 'C' is metal and 'E' is non-metal, So the bond formed is ionic.

A = 2, 8, 1
C:
$$2 e^{-}$$

C²
C²⁺
C²

d) 'D' is a non-metal and E is also a non-metal, so the bond formed will be covalent.



