

## PART-I (SHORT QUESTIONS)

Q.2 Write short answers to any SIX (6) questions.

(i) In how many categories elements are classified according to their conductivity?

Ans. **Classification of Elements:**

According to their conductivity, elements are classified into three categories.

(1) **Metals**

**Examples:** Fe, Na, Mg, Ag, Au, etc.

(2) **Non-metals**

**Examples:** H, He, C, N, O, S, P, etc.

(3) **Metalloids**

**Examples:** Si, Ge, etc.

(ii) **State two/four physical properties of metals.**

Ans. **Physical Properties of Metals:**

Important physical properties of metals are listed below.

(1) Almost all metals are solids (except mercury).

(2) They have high melting and boiling points.

(3) They possess metallic luster and can be polished.

(4) They are malleable (can be hammered into sheets), ductile (can be drawn into wires) and give off a tone when hit.

(5) They are good conductor of heat and electricity.

(6) They have high density.

(7) All metals are hard except sodium and potassium.

(iii) **Write two/four chemical properties of metals.**

(1) All metals easily lose electrons and form positive ions.

(2) They readily react with oxygen to form basic oxides.

(3) They usually form ionic compounds with non-metals.

(4) They have metallic bonding.

(iv) **What is meant by electropositive or metallic character?**

Ans. "Metals have the tendency to lose their valance electrons. This characteristic property of a metals is termed as electropositivity or metallic character."

(v) **Describe the position of metals, non-metals and metalloids in the periodic table.**

Ans. **Position of Metals in the Periodic Table:**

Metals occupy upper left position in the periodic table.

**Position of Non-metals in the Periodic Table:**

They occupy upper right positions in the Periodic Table.

**Position of Metalloids in the Periodic Table:**

They occupy central position in the periodic table.

(vi) **Why metallic character decreases along a period and increases in a group?**

Ans. Metallic character decreases across the period from left to right in the periodic table because size of atoms



decreases due to increase of nuclear charge. It means elements in the start of a period are more metallic. This character decreases as we move from left to right along the period.

Metallic character increases down the group because size of atoms increases. For example, lithium metal is less electropositive than potassium.

**(vii) What is the relationship between electropositivity and ionization energy?**

**Ans. Relationship between Electropositivity and Ionization Energy:**

Electropositive character depends upon the ionization energy which in turn depends on size and nuclear charge of the atom.

Small sized atoms with high nuclear charge have high ionization energy. In this way atoms having high ionization energy are less electropositive or metallic.

**(viii) Which group of metal is highly reactive?**

**Ans.** Group-1 (alkali metals) is highly reactive metals because Group-1 metals can easily lose 1 electron from the valence shell to form a positive ion.

For example, sodium which is Group-1 metal, loses 1 electron to form positive ions.



**(ix) Why sodium metal is more reactive than magnesium metals?**

**Ans.** Sodium has one electron in its valence shell. It has large size and has lowest ionization energy. Due to these reasons it can easily lose its valence electron and becomes more electropositive. On the other hand, magnesium has two electrons in its valence shell. Due to small size atom with high nuclear charge it has high ionization energy. The 1<sup>st</sup> ionization energy of magnesium is high but 2<sup>nd</sup> ionization energy is very high. It becomes very difficult to remove second electron from the  $\text{Mg}^+$  ion.

That is the reason sodium is more reactive metal than magnesium.



**Q.3 Write short answers to any FIVE (5) questions.**

**(i) What do mean by malleable and ductile?**

**Ans. Malleable:** "Metals can be hammered into sheets are called malleable."

**Ductile:** "Metals can be drawn into wires are called ductile."

**(ii) Give two/four physical properties of sodium metal.**

**(1)** Sodium is a silvery white having a metallic luster, very soft and can be cut with knife.

**(2)** It is very malleable and ductile metal.

**(3)** It is a good conductor of heat and electricity.

**(4)** It burns in air with golden yellow flame.

**(5)** Its melting point is  $97^{\circ}\text{C}$ .

**(6)** Its boiling point is  $883^{\circ}\text{C}$ .

**(7)** Its relative density is  $0.98 \text{ g cm}^{-3}$ .

**(8)** Its atomic size is 186 pm.

**(9)** Its ionic size is 102 pm.

**(10)** Its ionization energy is 496 kJ/mol.

**(iii) Give two/three uses of sodium metal.**

**Ans. Uses of Sodium:**

**(1)** Sodium-potassium alloy is used as a coolant in nuclear reactors.

**(2)** It is used to produce yellow light in sodium vapour lamps.



- (3) It is used as a reducing agent in the extraction of metals like Ti.

(iv) **Give two uses of calcium metal.**

**Ans. Uses of calcium**

- (1) It is used to remove sulphur from petroleum products.
- (2) It is used as reducing agent to produce Cr, U and Zr.

(v) **Give two/four uses of magnesium metal.**

**Ans. Uses of Magnesium**

- (1) Magnesium is used in flash lights and in fireworks.
- (2) It is used in the manufacture of light alloys.
- (3) Magnesium ribbon is used in Thermite Process to ignite aluminium powder.
- (4) Magnesium is used as anode for prevention of corrosion.

(vi) **Give two/four physical properties of silver metal.**

**Ans. Properties of Silver:**

- (1) It is white lustrous metal.
- (2) It is an excellent conductor of heat and electricity.
- (3) It is highly ductile and malleable metal.
- (4) Its polished surfaces are good reflectors of light.

(vii) **Give two/four uses of silver metal.**

**Ans. Uses of Silver:**

- (1) Compounds of silver are widely used in photographic films.
- (2) It is used in dental preparations.
- (3) It is highly ductile and malleable metal. That is why it is used to make coins, silver-wares and ornaments.
- (4) Its polished surfaces are good reflectors of light. Because of this, it is widely used in mirror industries.

(viii) **Give two/four physical properties of gold.**

**Ans. Properties of Gold:**

- (1) Gold is a yellow soft metal.
- (2) It is most malleable and ductile of all the metals. One gram of gold can be drawn into a wire of one and a half kilometre long.
- (3) Gold is very non-reactive or inert metal.
  - (i) It is not affected by atmosphere.
  - (ii) It is even not affected by any single mineral acid or base.
- (4) Gold is too soft to be used as such. It is always alloyed with copper, silver or some other metal.

(ix) **Give two/four uses of gold.**

**Ans. Uses of Gold:**

- (1) It is an ornamental metal because of its inertness atmosphere i.e. in air and water and strong acids.
- (2) It is used in making coins because it is most malleable and ductile of all the metals.



**Q.4 Write short answers to any FIVE (5) questions.**

(i) **Give some properties of platinum metal.**

**Ans. Properties of Platinum:**

- (1) It has unique characteristics like colour, beauty, flexibility and resistance to tarnish.
- (2) It is resistant to chemical attack. It does not oxidize in air at any temperature. It is resistant to tarnish.
- (3) It is soluble in hydrochloric acid and nitric acid.

(ii) **Give some uses of platinum metal.**



**Uses:**

It is more expensive than gold. Due to this reason it is used for the following purposes.

- (1) It is used to make jewelry items because of its unique characteristics like colour, beauty, strength, flexibility and resistance to tarnish.
- (2) It provides a secure setting for diamonds and other gemstones, enhancing their brilliance.
- (3) Platinum alloyed with palladium and rhodium are used as catalyst in auto-mobiles as catalytic convertor. They convert most of the gases being emitted by vehicles into less harmful carbon dioxide, nitrogen and water vapours.
- (4) Platinum is used in the production of hard disk drive coatings and fibre optic cables.
- (5) Platinum is used in the manufacturing of fibre glass reinforced plastic and glass for liquid crystal displays (LCD).

**(iii) Define non-metals. Give examples.**

**Ans.** Non-metals form negative ions (anions) by gaining electrons. In this way, non-metals are electronegative in nature and form acidic oxides.



**Examples:** Carbon (C), Phosphorus (P) and Sulphur (S), halogens are examples of non-metals.

**(iv) Describe two/four physical properties of non-metals.**

**Ans.**

- (1) Solids non-metals are brittle (break easily).
- (2) Non-metals are non-conductor of heat and electricity (except graphite).
- (3) They are not shiny, they are dull except iodine (it is lustrous like metals).
- (4) They are generally soft (except diamond).
- (5) They have low melting and boiling points (except silicon, graphite and diamond).
- (6) They have low densities.

**(v) Give oxidizing reactions of halogens.**

**Ans.** Oxidizing Properties:

All halogens are oxidizing agent.

Examples:

- (1) Fluorine is the strongest oxidizing element while iodine is the least i.e. is mild oxidizing agent. Fluorine will oxidize any of halide ion (X<sup>-</sup>) in solution and changes itself to F<sup>-</sup> ion.



- (2) Chlorine will displace Br<sup>-</sup> and I<sup>-</sup> ions from their salt solutions and oxidize them to bromine and iodine.



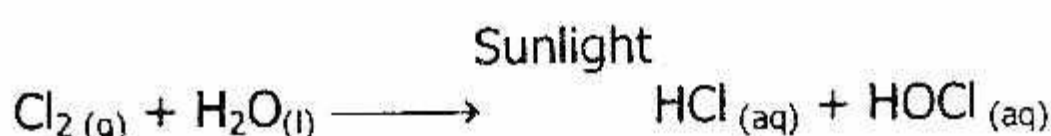
Solution turns from colourless to reddish brown.



- (3) Bromine will displace iodine from potassium iodide to form iodine.

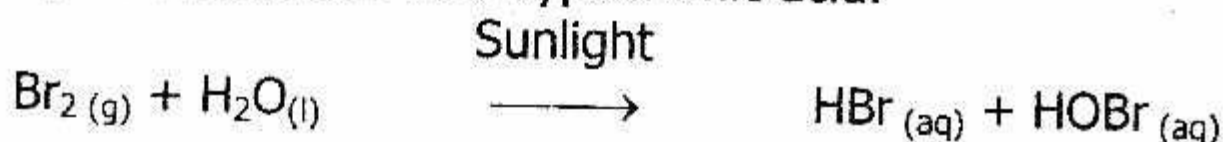
**(vi) Under what conditions chlorine react with water? What products are obtained?**

**Ans.** Chlorine reaction with water in the presence of sunlight and forms hydrochloric acid and hypochlorous acid.

**(vii) Write the reaction of bromine with water.**



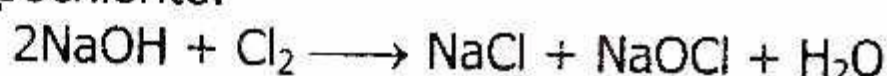
**Ans.** Bromine reacts with water in specific conditions. For example it reacts with water in sunlight and forms hydrobromic acid and hypobromic acid.



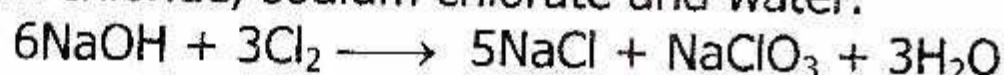
**(viii) Write the reaction of chlorine with NaOH.**

**Ans. Reaction of Chlorine with NaOH:**

- (1) Chlorine reacts with cold dilute NaOH to give sodium hypochlorite.



- (2) Chlorine reacts with hot conc. NaOH to give sodium chloride, sodium chlorate and water.



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## PART-II (LONG/DESCRIPTIVE QUESTIONS)

- Q.5 (a)** Compare the chemical properties and reactivities of alkali and alkaline earth metals. **(5)**

- (b)** Describe the chemical properties and uses of magnesium metal. **(5)**

**Ans. (a) See Chapter 8 Q.No.16**

**(b) See Chapter 8 Q.No.18**

- Q.6 (a)** Compare the physical properties of metals and non-metals. **(5)**

- (b)** Compare the chemical properties of metals and non-metals. **(5)**

**Ans. (a) See Chapter 8 Q.No.39**

**(b) See Chapter 8 Q.No.40**

- Q.7 (a)** Describe the chemical reactions of halogens. **(5)**

- (b)** Write down significance of non-metals. **(5)**

**Ans. (a) See Chapter 8 Q.No.48**

**(b) See Chapter 8 Q.No.49**

- Q.8 (a)** State electropositive or metallic character. Explain the change in trends of electropositivity in the periodic table. **(5)**

- (b)** What is the relation between electropositivity and ionization energy? Explain in details. **(5)**

**Ans. (a) See Chapter 8 Q.No.5**

**(b) See Chapter 8 Q.No.6**

- Q.9 (a)** Describe the physical properties of silver. How they make silver a useful metal? **(5)**

- (b)** Why cations are smaller and anions are bigger size than their respective neutral atom. **(5)**

**Ans. (a) See Chapter 8 Q.No.15**

**(b) See Chapter 8 Exc. Q.No.3**

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## PART-III (PRACTICAL QUESTIONS)

10.

- (i)** Which types of reaction, the formation of nitric acid from nitrogen and oxygen is during lightening? Exothermic or endothermic. **(2)**

- (ii)** To prepare the ice cream, the mixture of ammonium nitrate, ammonium chloride and ice is used. What is the objective of this mixture? **(3)**

**Ans. (i)** Endothermic reaction



- (ii) When ammonium nitrate, ammonium chloride are mixed in the presence of ice, an endothermic reaction types occur through which heat absorbed by the reactant. The temperature of the container containing ice creams is lowered, which keep the ice cream at the freezing point.

**11.**

- (i) How cooling is produced in a refrigerator? (2)
- (ii) What will happen when sodium carbonate and sodium bicarbonate are heated separately? (3)

**Ans.**

- (i) In a refrigerator, a gas is liquefied which produces intense cooling.
- (ii) On heating  $\text{NaHCO}_3$  decomposes into  $\text{NaCO}_3$  while  $\text{Na}_2\text{CO}_3$  is stable to heat.

**12.**

- (i) What happens to green coloured copper sulphate when it is heated? (2)
- (ii) How following binary compounds are formed in daily life?  
AgS, CO, CO<sub>2</sub> and SO<sub>2</sub>. (3)

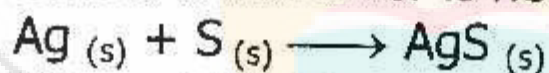
**Ans.**

- (i) When green coloured copper sulphate is heated, its water of crystallization is removed and it converts into black copper oxide.



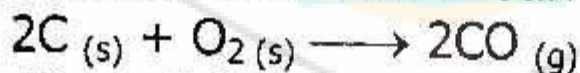
- (ii) Production of AgS:**

AgS is formed when silver is heated with sulphur.



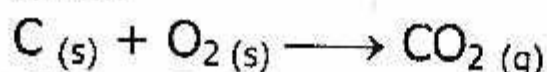
### Production of CO Gas:

CO is produced when coal is burnt in limited supply of air.



### Production of CO<sub>2</sub> Gas:

CO<sub>2</sub> gas is produced when coal is burnt in abundant supply of air.



### Production of SO<sub>2</sub> Gas:

$\text{SO}_2$  gas is produced when sulphur is burnt in air.

