



## UNIQUE STUDY POINT

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(d) Conductivity

**Q.5.  $\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow \dots + \text{H}_2\text{O}$**

(a)  $\text{Al}(\text{OH})_3$

(b)  $\text{Na}_2\text{O}$

(c)  $\text{NaAlO}_2$

(d)  $\text{AlNaO}_2$

**Q.6. Which of the following is the correct arrangement of the given metals in ascending order of their reactivity?**

**Zinc, Iron, Magnesium, Sodium**

(a) Zinc > Iron > Magnesium > Sodium

(b) Sodium > Magnesium > Iron > Zinc

(c) Sodium > Zinc > Magnesium > Iron

(d) Sodium > Magnesium > Zinc > Iron

**Q.7. Which of the following pairs will give displacement reactions?**

(a)  $\text{FeSO}_4$  solution and Copper metal

(b)  $\text{AgNO}_3$  solution and Copper metal

(c)  $\text{CuSO}_4$  solution and Silver metal

(d)  $\text{NaCl}$  solution and Copper metal

**Q.8. Non-metals form covalent chlorides because**

(a) they can give electrons to chlorine

(b) they can share electrons with chlorine

(c) they can give electrons to chlorine atoms to form chloride ions

(d) they cannot share electrons with chlorine atoms

**Q.9. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?**

(a)  $\text{FeO}$

(b)  $\text{Fe}_2\text{O}_3$

(c)  $\text{Fe}_3\text{O}_4$

(d)  $\text{Fe}_2\text{O}_3$  and  $\text{Fe}_3\text{O}_4$

**Q. 10. Which of the following are not ionic compounds?**

(i)  $\text{KCl}$

(ii)  $\text{HCl}$

(iii)  $\text{CCl}_4$

(iv)  $\text{NaCl}$

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- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (iii) and (iv)
- (d) (i) and (iii)

**Q.11. The electronic configuration of three elements X, Y and Z are as follows: X = 2, 4      Y = 2, 7**

**Z = 2,1      Which two elements will combine to form an ionic compound and write the correct formula,**

- (a)  $X_2Y$
- (b)  $ZY$
- (c)  $XZ_3$
- (d)  $Y_2Z$

**Q.12 Which of the following non-metal is lustrous?**

- (a) Sulphur
- (b) Oxygen
- (c) Nitrogen
- (d) Iodine

**Q.13. The atomic number of an element 'X' is 12. Which inert gas is nearest to X?**

- (a) He
- (b) Ar
- (c) Ne
- (d) Kr

**Q.14. Example of an amphoteric oxide is:**

- (a)  $Na_2O$
- (b)  $K_2O$
- (c)  $Al_2O_3$
- (d)  $MgO$

**Q. 15. Which one among the following is an acidic oxide?**

- (a)  $Na_2O$
- (b)  $CO$
- (c)  $CO_2$
- (d)  $Al_2O_3$

**Q.16. Composition of aqua-regia by volume is :**

- (a) Dil HCl (3) : Cone HNO<sub>3</sub> (1)
- (b) Cone HCl (3) : Dil HNO<sub>3</sub> (1)
- (c) Cone HCl (3) : Cone HNO<sub>3</sub> (1)
- (d) Dil HCl (3) : Dil HNO<sub>3</sub>

**Q.17. Galvanisation is a method of protecting iron from rusting by coating with a thin layer of**

- (a) Gallium
- (b) Aluminium
- (c) Zinc
- (d) Silver

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**Q. 18.** 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

- (a) Mg                      (b) Na                      (c) P                      (d) Ca

**Q.19.** 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?

- (a) Has high melting point  
(b) Has low melting point  
(c) Conducts electricity in molten state  
(d) Occurs as solid

**Q.20.** 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?

- (a) X is a metal  
(b) Y is a metal  
(c) Z is a non-metal  
(d) Y is a non-metal and Z is a metal

### ASSERTION AND REASON QUESTIONS:

**DIRECTION:** Each of these questions contains an Assertion followed by Reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements.

- (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.  
(b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.  
(c) Assertion is true but the Reason is false.  
(d) The statement of the Assertion is false but the Reason is true.

**Q.1. Assertion:**  $\text{Al}_2\text{O}_3$ , is an amphoteric oxide.

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**Reason:**  $\text{Al}_2\text{O}_3$  reacts with acid as well as base to form salt and water.

Q.2. **Assertion:** Nitrogen is a non-metal.

**Reason:** Nitrogen has 5 valence electrons..

Q.3. **Assertion:** Copper does not reacts with the  $\text{H}_2\text{SO}_4$ .

**Reason:** Copper is more reactive than hydrogen.

Q.4. **Assertion:** Silver becomes black in colour when exposed to atmosphere.  
**Reason:** Silver reacts with  $\text{H}_2\text{S}$  gas to form  $\text{Ag}_2\text{S}$  which is black in colour.

Q.5. **Assertion:** iron is found in the free state in nature.

**Reason:** iron a highly reactive element.

### CASE STUDY BASED QUESTIONS:

**Q.1. Read the following and answer the questions :**

On the basis of reactivity of different metals with oxygen, water and acids as well as displacement reactions, the metals have been arranged in the decreasing order of their reactivities. This arrangement is known as activity series or reactivity series of metals.

The basis of reactivity is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a metal loses electrons less rapidly to form a positive ion, it will react slowly with other substances. Therefore, such a metal will be less reactive.

1.1. Which of the following metals is less reactive than hydrogen?

- (a) Copper
- (b) Zinc
- (c) Magnesium
- (d) Lead

1.2. Which of the following elements is not present in stainless steel?

- (a) Iron
- (b) Chromium

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(c) Tungsten

(d) Nickel

1.3. Which of the following metals reacts vigorously with oxygen?

(a) Zinc

(b) Magnesium

(c) Sodium

(d) Copper

1.4. Which of the following represents the correct order of reactivity for the given metals?

(a)  $\text{Na} > \text{Mg} > \text{Al} > \text{Cu}$

(b)  $\text{Mg} > \text{Na} > \text{Al} > \text{Cu}$

(c)  $\text{Na} > \text{Mg} > \text{Cu} > \text{Al}$

(d)  $\text{Mg} > \text{Al} > \text{Na} > \text{Cu}$

1.5. Hydrogen gas is not evolved when a metal reacts with nitric acid. It is because  $\text{HNO}_3$  is a strong oxidising agent. It oxidises the H, produced to water and itself gets reduced to any of the nitrogenoxides ( $\text{N}_2\text{O}$ ,  $\text{NO}$ ,  $\text{NO}_2$ ). But \_\_\_\_\_ and \_\_\_\_\_ react with very dilute  $\text{HNO}_3$  to evolve  $\text{H}_2$  gas.

(a) Pb, Cu

(b) Na, K

(c) Mg, Mn

(d) Al, Zn

**Q.2. Read the following and answer the questions :**

Metals as we know, are very useful in all fields, industries in particular. Non-metals are no less in any way. Oxygen present in air is essential for breathing as well as for combustion. Non-metals form a large number of compounds which are extremely useful, e.g., ammonia, nitric acid, sulphuric acid, etc.

Non-metals are found to exist in three states of matter. Only solid non-metals are expected to be hard however, they have low density and are brittle. They usually have low melting and boiling points and are poor conductors of electricity.

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- 2.1. \_\_\_\_\_ is a non-metal but is lustrous
- (a) Phosphorus (b) Sulphur (c) Bromine (d) Iodine
- 2.2. Which of the following is known as 'King of chemicals'?
- (a) Urea (b) Ammonia (c) Sulphuric acid (d) Nitric acid
- 2.3. Which of the following non-metals is a liquid?
- (a) Carbon (b) Bromine (c) Iodine (d) Sulphur
- 2.4. Hydrogen is used
- (a) for the synthesis of ammonia (b) for the synthesis of methyl alcohol
- (c) in welding torches (d) all of these
- 2.5. Generally, non-metals are bad conductors of electricity but 'X' which is a form of carbon is a good conductor of electricity and is an exceptional non-metal. 'X' is
- (a) diamond (b) graphite
- (c) coal (d) coke

### VERY SHORT ANSWER TYPE QUESTIONS

Q.1. Name two metals which catch fire if kept in open

air. Ans: Sodium and Potassium

Q.2. Which of the following metals neither reacts with cold nor with hot water?

Sodium, Magnesium, Zinc, Iron,

Calcium Ans: Zinc and Iron

Q.3. Name two metals which can form hydrides with

hydrogen. Ans: Sodium and Calcium

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Q.4. Name the element which shows non-metallic properties but is also present in the activity series of metals.

Ans: Hydrogen

Q.5. What is rust ? Write its chemical formula.

Ans: Rust is brown, flaky substance. Its chemical formula is  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

### SHORT ANSWER TYPE QUESTIONS

Q.1. A non-metal X exists in different forms Y and Z. Y is the hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y and Z.

Ans: X – Carbon, Y – Diamond, Z – Graphite

Q.2. State reasons for the following:

(i) Electric wires are covered with rubber-like material.

(ii) From dilute hydrochloric acid, zinc can liberate hydrogen gas but copper cannot. Ans: (i) It is because rubber is an insulator and does not allow current to flow through it.

(ii) Zinc is placed above hydrogen in the reactivity series of metals while copper is placed below it. Metals placed above hydrogen can displace hydrogen from water and acids while those below it cannot. Therefore, zinc can displace hydrogen from dilute HCl whereas copper cannot.

Q.3. Give the formulae of the stable binary compounds that would be formed by the combination of the following pairs of elements.

(a) Mg and  $\text{N}_2$

(b) Li and  $\text{O}_2$

(c) Al and  $\text{Cl}_2$

(d) K and

$\text{O}_2$  Ans:

(a)  $\text{Mg}_3\text{N}_2$

(b)  $\text{Li}_2\text{O}$

(c)  $\text{AlCl}_3$

(d)  $\text{K}_2\text{O}$



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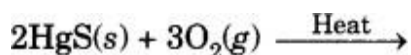
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Q.4. Name any one metal which reacts neither with cold water nor with hot water, but reacts with heated steam to produce hydrogen gas.

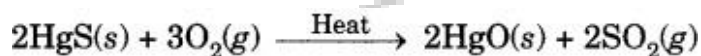
Ans: Iron



Q.5. Complete the chemical equation.



Ans:



### LONG ANSWER TYPE QUESTIONS

Q.1. A metal E is stored under kerosene. When a small piece of it is left open in air, it catches fire. When the product formed is dissolved in water, it turns red litmus to blue.

(i) Name the metal E.

(ii) Write the chemical equation for the reaction when it is exposed to air and when the product is dissolved in water.

(iii) Explain the process by which the metal E is obtained from its molten chloride.

Ans: (i) The available information suggests that the metal (E) is sodium (Na).

The solution is basic and it turns red litmus blue.

(iii) The metal is obtained by the process of electrolytic reduction.

Q.2. A student has been collecting silver coins and copper coins. One day, she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings? Write the chemical name of black and green coatings.

Ans: The name of the phenomenon is corrosion. The chemical name of black coating is silver sulphide ( $\text{Ag}_2\text{S}$ ) formed due to attack of  $\text{H}_2\text{S}$  gas present in the atmosphere on silver and that of green coating is basic copper carbonate formed due to attack of moist air ( $\text{CO}_2$ ,  $\text{O}_2$  and  $\text{H}_2\text{O}$  vapours) on copper.

Q.3. (a) Name the main ore of mercury. How is mercury obtained from its ore?

(b) Give balanced chemical equation.

(c) What is thermite reaction? How is it used to join the railway tracks or cracked machine parts?

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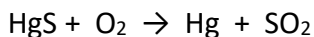
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(d) Name the method used to extract metals of high reactivity.

**Ans:** (a) Cinnabar

(b) Mercury is obtained from its ore by roasting.



(c) When aluminium is heated with  $\text{Fe}_2\text{O}_3$  to get molten iron, it is called thermite reaction.  $\text{Fe}_2\text{O}_3 + 3\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

Molten iron is used to weld broken railway tracks.

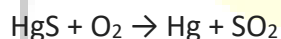
(d) Electrolytic reduction

Q.4. Explain how the following metals are obtained from their compounds by reduction process:

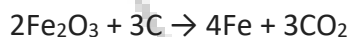
(i) Metal X which is low in reactivity series

(ii) Metal Y which is in the middle of the series Give one example of each type.

**Ans:** (i) Metals which are low in reactivity series can be obtained by heating their compounds. For example, mercury is obtained by heating its ore, cinnabar ( $\text{HgS}$ ), in air.



(ii) Metals which are in the middle of the series are generally obtained by heating their compounds with some reducing agent such as carbon. For example, iron is obtained from haematite ( $\text{Fe}_2\text{O}_3$ ) by reduction with carbon.



Q.5. Explain the following:

(a) Reactivity of Al decreases if it is dipped in conc.  $\text{HNO}_3$

(b) Carbon cannot reduce the oxides of Na or Mg.

(c) NaCl is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as in molten state

(d) Iron articles are galvanised.

**Ans:** (a) When Al metal is dipped in conc.  $\text{HNO}_3$  for sometime, it is oxidised initially to aluminium oxide ( $\text{Al}_2\text{O}_3$ ). The oxide gets deposited on the surface of the metal and forms a protective

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coating on the surface. The metal is said to become passive towards air, acids and alkalies. Its reactivity therefore, decreases.

(b) Both Na and Mg are more reactive than carbon. Therefore, carbon is not in a position to reduce the oxides of these metals.

(c) NaCl is an ionic compound. Its electrical conductivity is due to the mobility of  $\text{Na}^+$  and  $\text{Cl}^-$  ions. These ions cannot move in the solid state. However, they can do so either in molten state of the salt or when it forms an aqueous solution in water.

(d) Iron has a tendency to get rusted in atmosphere by reacting with oxygen and water vapours present in air. In order to check rusting, iron articles are generally coated with zinc. This process is known as galvanization.

### ANSWER KEY

#### MULTIPLE CHOICE QUESTIONS

1	d	11	b
2	b	12	d
3	a	13	c
4	a	14	c
5	c	15	c
6	d	16	c
7	b	17	c
8	b	18	b
9	c	19	b
10	b	20	d

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### ASSERTION AND REASON

QUESTIONS 1. -a

2. -b

3. - c

4. -

a

5. --d

### CASE STUDY QUESTIONS

1. (1.1) -a

(1.2) - c

(1.3) - c

(1.4) - a

(1.5) -c

2. (2.1) - d

(2.2) -c

(2.3) - b

(2.4) - d

(2.5) --b

