CLASS X :CHAPTER 3 IMPORTANT QUESTIONS

Metals and Non metals

MULTIPLE CHOICE QUESTIONS

Q.1. Aluminium is used for making cooking utensils. Which of the following properties of aluminiumare responsible for the same?

(i) Good thermal conductivity

(ii) Good electrical conductivity

(iii) Ductility

(iv) High melting point

(a) (i) and (ii) (b) (i) and (iii)

(c) (ii) and (iii) (d) (i) and (iv)

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

(a) Iron

(b) Aluminium

(c) Calcium

(d) Sodium

Q.3. The poorest conductor of heat among metals is

(a) Lead (b) Mercury (c) Calcium (d) Sodium

Q.4. Which property of metals is used for making bells and strings of musical instruments like Sitarand Violin?

(a) Sonorousness

(b) Malleability

(c) Ductility

(d) Conductivity

Q.5. $Al_2O_3 + 2NaOH \rightarrow$ ..... + H_2O

(a) $Al(OH)_3$ (b) Na_2O (c) $NaAlO_2$ (d) $AlNaO_2$

Q.6. Which of the following is the correct arrangement of the given metals in ascending order oftheir 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 dis-placement reactions?

(a) $FeSO_4$ solution and Copper metal

(b) $AgNO_3$ solution and Copper metal

(c) $CuSO_4$ solution and Silver metal

(d) 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 withsteam?

(a) FeO (b) Fe_2O_3 (c) Fe_3O_4 (d) Fe_2O_3 and Fe_2O_4

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

(i) KCl (ii) HCl (iii) CCl_4 (iv) NaCl

(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 correctformula,

(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 HNO3 (1)

(b) Cone HCl (3) : Dil HNO3 (1)

(c) Cone HCl (3) : Cone HNO3 (1)

(d) Dil HC1 (3) : Dil HNO3

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

Q. 18.An element X is soft and can be cut with a knife. This is very reactive to air and cannot be keptopen 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 ofthe 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 theAssertion.
(b) The Assertion and the Reason are correct but the Reason is not the correct explanation of theAssertion.
(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**: Al_2O_3, is an amphoteric oxide.

Reason: Al_2O_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 H_2SO_4.
Reason: Copper is more reactive than hydrogen.

Q.4. Assertion: Silver becomes black in colour when exposed to atmosphere.Reason: Silver reacts with H_2S gas to form Ag_2S 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 displacementreactions, 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 meal loses electrons less rapidly to form a positive ion, itwill 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

(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) Na > Mg > Al > Cu

(b) Mg > Na > Al > Cu

(c) Na > Mg > Cu > Al

(d) Mg > Al > Na > Cu

1.5. Hydrogen gas is not evolved when a metal reacts with nitric acid. It is because HNO_3, is a strong oxidising agent. It oxidises the H, produced to water and itself gets reduced to any of the nitrogenoxides (N_2O, NO, NO_2). But_____and_____react with very dilute HNO_3 to evolve 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 inany 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 behard however, they have low density and are brittle. They usually have low melting and boiling points and are poor conductors of electricity.

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 goodconductor 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, CalciumAns: Zinc and Iron

Q.3. Name two metals which can form hydrides with hydrogen.Ans: Sodium and Calcium

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

Ans: Hydrogen

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

Ans: Rust is brown, flaky substance. Its chemical formula is $Fe_2O_3.xH_2O$

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 agood conductor of electricity. Identify X, Y and Z.

Ans: X –Carbon, Y – Diamond, X – 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.Ansr:(i) It is because rubber is an insulator and does not allow current to flow through it.

(ii) Zinc is 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 ofthe following pairs of elements.

(a) Mg and N_2

(b) Li and O_2

(c) Al and Cl_2

(d) K and O_2Ans:

(a) Mg_3N_2 (b) Li_2O (c) $AlCl_3$ (d) K_2O

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

Ans: Iron

$3Fe\ (s) + 4H_2O\ (g) \rightarrow Fe3O_4\ (s) + 4H_2\ (g)$

Q.5. Complete the chemical equation.

$$2HgS(s) + 3O_2(g) \xrightarrow{Heat}$$

Ans:

$$2HgS(s) + 3O_2(g) \xrightarrow{Heat} 2HgO(s) + 2SO_2(g)$$

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 productis 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 coatingon 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 (Ag_2S) formed due to attack of H_2S gas present in the atmosphere on silver and that of green coating is basic copper carbonate formed due to attack of moist air (CO_2, O_2 and H_2O vapours) oncopper.

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?

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

Ans: (a) Cinnabar

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

$HgS + O_2 \rightarrow Hg + SO_2$

(c) When aluminium is heated with Fe2O3 to get molten iron, it is called thermite reaction.$Fe_2O_3 + 3Al \rightarrow Al_2O_3 + 2Fe$

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

seriesGive 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 (HgS), in air.

$HgS + O_2 \rightarrow Hg + SO_2$

(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 (Fe_2O_3) by reduction with carbon.

$2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$

Q.5. Explain the following:

(a) Reactivity of Al decreases if it is dipped in cone. HNO3

(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 inaqueous solution as in molten state

(d) Iron articles are galvanised.

Ans: (a) When Al metal is dipped in cone. HNO_3 for sometime, it is oxidised initially to aluminium oxide (Al_2O_3). The oxide gets deposited on the surface of the metal and forms a protective

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

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

(c) NaCl is an ionic compound. Its electrical conductivity is due to the mobility of Na^+ and 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 and aqueous solution in water.

(d) Iron has a tendency to get rusted in atmosphere by reacting with oxygen and water vapourspresent 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

ASSERTION AND REASON

QUESTIONS1. –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

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