INDIAN SCHOOL NIZWA - WORKSHEET

CHEMISTRY

CH: 3 Metals & Non-Metals

Name: _____ Date:_____ Class: XSec: ___

I. Multiple choice questions

1. What happens when calcium is treated with water?
   (i) It does not react with water.
   (ii) It reacts violently with water.
   (iii) It reacts less violently with water.
   (iv) Bubbles of hydrogen gas formed stick to the surface of calcium.
   (a) (i) and (iv) (b) (ii) and (iii)
   (c) (i) and (ii) (d) (iii) and (iv)
2. Beakers A, B and C contain zinc sulphate, silver nitrate and iron (II) sulphate solutions respectively. Copper pieces are added to each beaker. Blue colour will appear in case of
   (a) beaker A (b) beaker B
   (c) beaker C (d) all the beakers

3. In each test tubes , ,A B C and D , 2mL of solution of $Al_2(SO_4)_3$ in water was filled. Clean pieces of zinc was placed in test tube A, clean iron nail was put in test tube B , silver (Ag) was placed in test tube C and a clean copper wire was placed in test tube D . Which of the following option (s) is/are correct about above experiment?
   (a) Zinc is more reactive than aluminium
   (b) Copper is more reactive than aluminium
   (c) Zinc is more reactive than copper
   (d) Zinc, iron, silver and copper are less reactive than aluminium
4. On the basis of the sequence of the given reactions identify the most and least reactive elements:
   $X+YA \rightarrow XA+Y$
   $X+YB \rightarrow XB+Y$
   $Z+XA \rightarrow ZA+X$

a) X and Z (b) Y and Z (c) Z and X (d) Z and Y

5. E is an element that's ore is rich in E_2O_3. E_2O_3 is not affected by water. It forms two chlorides, ECl_2 andECl_3. The element E is

(a) copper (b) zinc (c) aluminium (d) iron

II. Answer the following

1. Why does Al does not react with water under ordinary conditions?

2. 1. Name the following.
   A) Two metals which are poor conductors of heat.
   B) Two metals with very low melting points.
   C) Two allotropes of carbon.
   D) Two metals which react with dilute HNO_3 and evolve H_2.

3. Complete the following reactions;

   a) Fe+ H_2O (A) → B + C
   b) Zn+ $CuSO_4$ → D +E
   c) Mg +$H2SO_4$ → F+G
   d) Mn+ HNO_3 → H +I

4. How would you show that Ag is less reactive than Cu?

5. A, B & C are three elements which undergo chemical change according to the following equations.

   $A_2O_3 + 2B \rightarrow B_2O_3 + 2A$
   $3CSO_4 + 2B \rightarrow B_2(SO_4)_3 + 3C$
   $3CO + 2A \rightarrow A_2O_3 + 3C$
   Arrange the elements in order of decreasing reactivity

6. Explain the terms i) anodizing ii) aqua regia.

7. Give reasons

   a) Ionic compounds conduct electricity in the molten state not in the solid state?

   b) H_2 gas is not liberated when metals react with HNO_3.

8. a) Name a metal for each case

   i) It doesn't react with cold as well as hot water but reacts with steam.

   ii) It doesn't react with any physical state of H_2O.

   iii) It reacts with hot water

9. A strip of Cu is placed in a beaker containing zinc sulphate solution. On observing the strip next

day, was there any colour change in the strip? Justify your answer.

10. Choose the acidic, basic and neutral oxides from the following.

Na_2O, NO_2,CO_2, CO, SO_2, MgO, H_2O ,CaO, P_2O_3

11. Show the formation of i) Aluminium fluoride ii) potassium oxide by the transfer of electrons between combining atoms.

12. Observe the action of Zn, Fe, Cu & Al metals on the following salt solutions:

a) $ZnSO_4(aq)$ b) $FeSO_4(aq)$ c) $CuSO_4(aq)$ d) $Al_2(SO_4)_3$.
b) Mention the colour changes & Write the balanced equation for each.
c) Based on the above observation arrange these metals in the decreasing order of reactivity.

13. Give reasons for the following:
a) Metals good conductors of electricity b) Zinc oxide is considered as an amphoteric oxide.
c) Non-metals, in general do not displace hydrogen from dilute acids.
d) Al is a highly reactive metal, still it is used to make utensils for cooking

14. An element forms an oxide A_2O_3 which is acidic in nature. Identify A as a metal or non-metal.

15. When calcium metal is added to water the gas evolved does not catch fire but the same gas evolved on adding sodium metal to water catches fire. Why is it so?

16. Which property makes solder alloy suitable for welding purpose?

17. The reaction of metal X with Fe2O3 is highly exothermic and is used to join railway track. Identify the metal and give the reaction involved.

18. Name a metal/non-metal which

a) makes Fe strong b) Which is alloyed with other metal to make amalgam. c) Which is used to galvanised Fe articles d) The metal exposed to air for a long time gives black coating. e) The ore of Hg.

19. Why is NaCl soluble in water not in kerosene?

20. Out of two metals P &Q ,P is less reactive than Q. Suggest an activity to arrange these metals in the order of decreasing reactivity. Support your answer with a suitable chemical equation.

21. An ore on treatment with dilute HCl gives brisk effervescence. What kind of ore is this? How can the metal be extracted from its concentrated ore.

III. Assertion and reason questions

i) Both A &B are true and R is the correct explanation of A
ii) Both A &B are true and R is not the correct explanation of A
iii) A is true , but R is false

iv) A is false, but R is true

1) Assertion: Zn becomes dull in moist air.
   Reason: Zn is coated by a thin film of its basic carbonate in moist air.
2) Assertion: Aqua regia is a mixture of concentrated HCl and HNO_3 in the ration1:3 .
   Reason : Aqua regia is a corrosive liquid which can dissolve gold.
3) Assertion:Silver becomes black on prolonged exposure to air
   Reason : H_2S present in air reacts with Ag forms Ag_2S

IV. HOTS QUESTIONS

1. An element A reacts with water to form a compound B which is used in white washing. The compound B on heating forms an oxide C which on treatment with water gives back B. Identify A B, and C and give the reactions involved.

2. A metal A is used in thermite process ,when heated with oxygen gives corresponding oxide B which is amphoteric in nature. Identify A & B and give the reaction of B with acid and base.

3. An element burns with golden flame in air. It reacts with another element B, atomic number 17 to give a product C. An aqueous solution of product C on electrolysis gives a compound D and liberates hydrogen. Identify A B C and D. Also write down the equations for the reactions involved.

V. Study the given paragraph and answer the following questions

1.The metal sodium reacts with air and water. A student reacted sodium with water and measured the volume of gas at intervals of 30 seconds. The results are shown below:

Time/s	0	30	60	90	120	150	180
Volume/cm^3	0	40	60	74	86	96	140

(a) At what time rate of reaction was fastest?

(b) Name the gas liberated in the above reaction. Write the reaction involved.

(c) How will you test this gas?

(d) What will be colour of universal indicator, when added to solution formed? What does it show?

(e) Which ions are responsible for change in colour of universal indicator?

(f) What will be colour of phenolphthalein in the solution formed?

2. 2. Pure metals are usually too soft and weak for most uses. In pure metals the atoms are arranged orderly in layers. When force is applies to the metal, the layers of metal atoms can slide over one another. To improve the strength and hardness of metals, atoms of another element can be added usually in small amounts which prevents atoms of the metal from sliding over one another, making the metals stronger and harder and less likely to get its shape distorted. The final product is an alloy of metal, e.g. ornaments are made up of 22 carat gold in which copper is added to gold. Alloy is

a homogeneous mixture of two or more metals. One of them can be non-metal also, e.g., steel is an alloy of Fe and carbon. Alloys are made so as to improve properties of metals. Amalgam is alloy of metal with mercury.

(a) What is compostion of stainless steel? What is its advantage?

(b) What is solder? What is its use and why?

(c) What is advantage of Sodium amalgam over sodium metal?

(d) How much gold is present in 22 carat gold?