DAY BOYS SENIOR SECONDARY SCHOOL CH-86.

SCIENCE

L-4. METALS AND NON-METALS. STD & SEC VIII. A

C.W NOTES.

ANSWER THE FOLLOWING:

1. How do we generally classify materials?

2. List a few physical properties generally used to distinguish metals and non metals.

3. Define.

1) Malleability (2) Ductility (3) Conductivity

(4) Sonorous (5) Lustre.

Ans 1 ⟶ Ans Page 45.

2 → Ans Page 45.

3) Conductivity:

Conductivity is the property of metals by which it allows electricity / heat to pass through it.

4) Sonorous:

The property of metals by which it, when hit, produces a metallic / ringing sound is sonorous.

5) Lustre:

The property of metals by which it has a shiny appearance is called lustre.

4. You are given an iron nail, sulphur, coal piece, copper wire. With the help of a simple activity, show which of these materials are poor / good conductors of electricity.

Materials required: .... Complete it.

Procedure:

Set up an electric tester by connecting the battery terminals to the conducting wires, leaving a gap, to create an open circuit.

· Now close the circuit by connecting the other ends of the wires to each of the given materials; to fill the gap.

· Record the result in each of the cases.

OBSERVATION:

In case of the iron nail and copper wire, the bulb will glow.

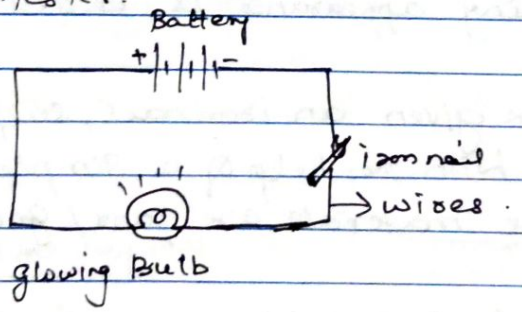
· In the case of the sulphur and coal piece, the bulb will not glow.

Inference:

Iron & copper allow electricity to pass through as they are metals; so they are good conductors of electricity.

Sulphur and coal (mainly carbon) do not allow electricity to pass through as they are non-metals therefore, they are poor conductors of electricity.

electric tester.



5. Name two metals that can be cut by a knife.
(Na)- Sodium and Potassium (K)

6. Give some uses of metals.
Refer Page 51. (Uses of metals)
Metals are used in making machinery :.... Complete it

7. Give some uses of non-metals.
Ans refer Page 51 · dots (5 points).

8. Name a metal and nonmetal found in liquid state at room temperature.
Metal - Mercury (Hg)
Non-metal - Bromine (Br)

9. Chemical properties of metals.

I Reaction of metal with oxygen

When a metal reacts with oxygen, the respective metal oxide is formed.

Metal + oxygen → Metal oxide

(eg) Sodium + oxygen → Sodium oxide.
$Na + O_2 \rightarrow Na_2O$.

(b) Magnesium + Oxygen → magnesium oxide.
$Mg + O_2 \rightarrow MgO$.

II Reaction of metal oxide with water.

Metal oxide + water → Metal hydroxide.

When a metal oxide reacts with water, the respective metal hydroxide is formed

e.g) Sodium oxide + water (H_2O) → Sodium hydroxide.

$Na_2O + H_2O \rightarrow NaOH$.

Magnesium oxide + water → Magnesium hydroxide.
$MgO + H_2O \rightarrow Mg(OH)_2$.

10. Describe an activity to show the nature of rust as a result of reaction between iron, oxygen and water.

Collect a spoon full of rust and dissolve it in a very little amount of water.

You will find that the rust remains suspended in water. Shake the suspension well.

Test the solution with red & Blue litmus paper.

Draw fig 4.3. Page 46.
(Testing the nature of rust). (Colour it)

N. Illustrate an experiment to show that non-metals are acidic in nature.
Equation / Formula.

When Sulphur is dissolved in water, Sulphurous acid is formed.

$$SO_2 + H_2O \longrightarrow H_2SO_3$$
Sulphurous

Materials required:
Dilute HCl, powdered Sulphur, deflagrating Spoon, source of heat / fire, gas jar, water, litmus papers.

Procedure: Page 47. Activity 4.4.
from Take a small amount .... (To) Check the Solution with red / Blue litmus paper.

Draw 4.4 (b) Page 47 (Colour it)

Observation: The red litmus paper stays unchanged

The blue litmus paper turns red.

Inference: From this activity we can infer that non-metals are acidic in nature.

Draw the diagram: 4.4a + b. Page 47.

12. How do the following metals react with water?

Sodium: Sodium reacts vigorously with water. Hence Sodium is stored in Kerosene in labs.

Iron: Iron reacts with water slowly.

13. Why is phosphorus stored in water?

Phosphorus is a very reactive non-metal which catches fire when exposed to air.
. So to prevent the contact of phosphorus with atmospheric oxygen, it is stored in water.

14. What happens when metals and non-metals react with acid?

Metal + Acid → Salt + hydrogen.

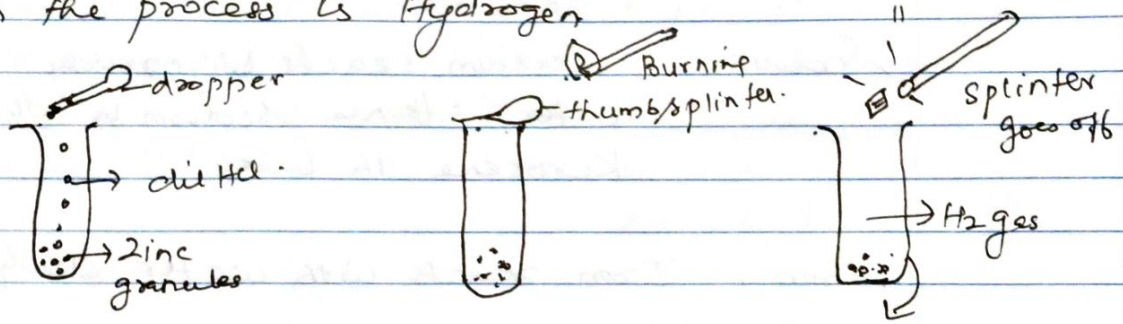
$Zn + 2HCl \rightarrow ZnCl + H_2$.

Experiment For the testing of metal and Acid's reactions

Procedure:

Take any metal like zinc granules in a test tube, and add few drops of dil. HCl to it. Close the mouth of the test tube, with your thumb so that the gas produced does not escape. Introduce a burning splinter to the mouth of the test tube and then remove the thumb.

Observation: We will observe that the burning splinter will be put off and a 'pop' sound will be heard; indicating that the gas formed in the process is Hydrogen.



$$Zn + 2HCl \rightarrow ZnCl_2 + H_2\uparrow$$

Reaction of Metals with Bases:

Experiment for the testing of metals & bases reaction

Procedure: Prepare a fresh solution of Sodium Hydroxide in a test-tube by dissolving 3-4 pellets of it in 5 ml of water.

- Drop a piece of aluminium foil into it.
- Bring a burning match stick near the mouth of the test tube. Observe carefully.

OBSERVATION

No reaction will take place.

16. What is displacement reaction.
A reaction in which a more reactive metal displaces a lower reactive metal in its solution form is called displacement reaction.

17. Explain an activity to show displacement reaction

1. Take five 100ml beakers and label them A, B, C, D, E.
2. Take about 5 ml of water in each beaker.
3. dissolve each beaker a teaspoon of each substance as indicated.
keep the beakers undisturbed for some time record your observations.

* Diagrams - 4.8 a + b.
Initial Components.

Draw the diagram from the reader. P-50.
Activity 4.8 a + b.
Then write inital Components.

Beaker A : Copper sulphate ($CuSO_4$) + Zinc granules.
Beaker B : Copper sulphate ($CuSO_4$) + Iron nail.
Beaker C : Zn sulphate + Cupper
Beaker D : Iron sulphate + Cu
Beaker E : Zn sulphate + Iron.
Beaker

A → $CuSO_4 + Zn \rightarrow ZnSO_4 + Cu$.
Since Zinc is more reactive.

B → $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$.
Since iron is more reactive than copper

C → $ZnSO_4 + Cu \rightarrow$ No reaction.
No reaction takes place since Copper is less reactive than zinc.

D → $FeSO_4 + Cu \rightarrow$ No reaction
Copper less reactive, so no reaction takes place

E → $ZnSO_4 + Cu \rightarrow$ No reaction
Copper is less reactive.

Page 52 Paheli qn:

18 The doctor reported iron deficiency in ~~my~~ our body ? Where is iron in our body ? What happens when there is deficiency of iron in our body ?

Iron is found in RBC in our body. Iron helps the haemoglobin which helps to transport O_2 to our body.

If there is a deficiency of iron the person will suffer from a disease called Anaemia.

An anaemic person will be dull, inactive and will get tired very easily.

19. When a copper vessel is exposed to moist air for a long time, it acquires a dull green coating. Why ? Give the necessary equation.
Ans page 47. Orange Box. Write the equation also.