# CHEMISTRY

# BOOKS - ICSE

# STUDY OF THE FIRST ELEMENT - HYDROGEN

## Exercise 6 A

**1.** Justify the position of hydrogen in the periodic table on the basis of its electronic

configuration.

Watch Video Solution

**2.** Why does hydrogen show dual nature ?

Watch Video Solution

**3.** Compare hydrogen with alkali metals on the basis of:

Ion formation

Watch Video Solution

**4.** Compare hydrogen with alkali metals on the basis of:

Reducing Power

 Watch Video Solution

**5.** Compare hydrogen with alkali metals on the basis of:

Reaction with oxygen

 Watch Video Solution

**6.** Compare hydrogen with alkali metals on the basis of:

Oxide formation

Watch Video Solution

**7.** In what respect does hydrogen differ from:

alkali metals

Watch Video Solution

**8.** In what respect does hydrogen differ from:

halogens?

Watch Video Solution

**9.** Give the general group study of hydrogen with reference

valence electrons

Watch Video Solution

**10.** Give the general group study of hydrogen with reference

burning

 Watch Video Solution

**11.** Give the general group study of hydrogen with reference

reducing power.

 Watch Video Solution

**12.** Why was hydrogen called 'inflammable air' ?

Watch Video Solution

**13.** State some sources of hydrogen.

Watch Video Solution

**14.** Compare hydrogen and halogens on the basis of:

physical state

Watch Video Solution

**15.** Compare hydrogen and halogens on the basis of:

ion formation

Watch Video Solution

**16.** Compare hydrogen and halogens on the basis of:

valency

Watch Video Solution

**17.** Compare hydrogen with alkali metals on the basis of:

Reaction with oxygen

Watch Video Solution

**18.** Which metal is preferred for preparation of hydrogen

from water?

Watch Video Solution

**19.** Which metal is preferred for preparation of hydrogen from acid ?

Watch Video Solution

**20.** Write the reaction of steam with red hot iron.

Watch Video Solution

**21.** Why steam with red hot iron reaction considered a reversible reaction ?

Watch Video Solution

**22.** Why zinc and aluminium are considered to have unique nature. Give balanced equations to support your answer.

Watch Video Solution

**23.** Write balanced equations for the following:

Iron reacts with dil HCI

Watch Video Solution

**24.** Write balanced equations for the following:

Zinc reacts with caustic soda solution

Watch Video Solution

**25.** Write balanced equations for the following:

Lead reacts with potassium hydroxide

Watch Video Solution

**26.** Write balanced equations for the following:

Aluminium reacts with fused sodium hydroxide.

Watch Video Solution

**27.** Write balanced equations and give your observations when the following metals react : Sodium with cold water

Watch Video Solution

**28.** Write balanced equations and give your observations when the following metals react : Calcium with cold water

Watch Video Solution

**29.** Write balanced equations and give your observations when the following metals react : Magnesium with boiling water

Watch Video Solution

**30.** Write balanced equations and give your observations when the following metals react : Magnesium with steam.

Watch Video Solution

**31.** Under what conditions iron reacts with water.

Watch Video Solution

**32.** Write the balanced equation when iron reacts with water.

Watch Video Solution

**33.** What is noticed if the products are not allowed to escape when iron reacts with

water?

Watch Video Solution

**34.** From the knowledge of activity series, name a metal which shows the following properties

It reacts readily with cold water

Watch Video Solution

**35.** From the knowledge of activity series, name a metal which shows the following properties

It displaces hydrogen from hot water

Watch Video Solution

**36.** From the knowledge of activity series, name a metal which shows the following properties

It displaces hydrogen from dilute HCI

Watch Video Solution

**37.** From the knowledge of activity series, name a metal which shows the following properties

It forms a base which is insoluble in water.

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**38.** Complete the following word equations :

Sodium hydroxide + zinc $\rightarrow$ hydrogen +.....

Watch Video Solution

**39.** Complete the following word equations :

Calcium + water $\rightarrow$ calcium hydroxide + .....

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## Exercise 6 B

**1.** Hydrogen can be prepared with the metal zinc by using :

acid

Give an equation in each case.

Watch Video Solution

**2.** Hydrogen can be prepared with the metal zinc by using :

alkali

Give an equation in each case.

Watch Video Solution

**3.** Hydrogen can be prepared with the metal zinc by using :

water

Give an equation in each case.

Watch Video Solution

**4.** For laboratory preparation of hydrogen, give the following:

materials used

Watch Video Solution

**5.** For laboratory preparation of hydrogen, give the following:

method of collection

Watch Video Solution

**6.** For laboratory preparation of hydrogen, give the following:

chemical equation

Watch Video Solution

**7.** For laboratory preparation of hydrogen, give the following:

fully-labelled diagram

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**8.** Mention any two impurities present in hydrogen prepared in laboratory.

Watch Video Solution

**9.** How are these impurities removed ?

Watch Video Solution

**10.** Which test should be made before collecting hydrogen in a gas jar?

Watch Video Solution

**11.** Why is nitric acid not used in the preparation of hydrogen?

Watch Video Solution

**12.** Why is hot concentrated sulphuric acid not used in the preparation of hydrogen ?

Watch Video Solution

**13.** Hydrogen is prepared by Bosch process ? Write the balanced equations of the reactions with conditions.

Watch Video Solution

**14.** Hydrogen is manufactured by Bosch Process'.

How can you obtain hydrogen from a mixture of hydrogen and carbon monoxide ?

Watch Video Solution

**15.** Write balanced equations for the following reactions.

Steam is passed over red hot iron.

Watch Video Solution

**16.** Write equations for the reactions of

(i) iron with steam

(ii) calcium and potassium with water

Watch Video Solution

**17.** A small piece of calcium metal is put into a small trough containing water. There is effervescence and white turbidity is formed.

Name the gas formed in the reaction. How would you test the gas ?

Watch Video Solution

**18.** A small piece of calcium metal is put into a small trough containing water. There is effervescence and white turbidity is formed. Write an equation for the reaction.

Watch Video Solution

**19.** A small piece of calcium metal is put into a small trough containing water. There is effervescence and white turbidity is formed. What do you observe when a few drops of red litmus solution are added to the turbid solution ?

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**20.** Thin sprips of magnesium, copper and iron are taken.

Write down what happens when these metals are treated as follows:

(i) Heated in presence of air (ii) Heated with dil. HCI (iii) Added to an aqueous solution of zinc sulphate

Watch Video Solution

**21.** Thin sprips of magnesium, copper and iron are taken.

Arrange these metals in descending order of reactivity.

Watch Video Solution

**22.** Hydrogen is evolved by the action of cold dil. $HNO_3$, on

A. Fe

B. Cu

C. Mg

D. Zn

**Answer:**

Watch Video Solution

**23.** Which metal produces hydrogen gas on reaction with cold water?

(a) Al

(b) Fe

(c) Pd

(d) Na

A. Al

B. Fe

C. Pd

D. Na

**Answer:**

Watch Video Solution

**24.** The composition of the nucleus of deutrium is

A. $1e^{-}$ and $1P$

B. $1P$ and $1A$

C. $1n$ and $\leq$

D. $2P$ and $1e^-$

**Answer:**

Watch Video Solution

**25.** Elements which show unique nature in the preparation of hydrogen are

Na, K, Li

Mg, Ca, Ba

Al, Zn, Pb

Fe, Cu, Ag

Watch Video Solution

**26.** Give reason for the following:

Zinc granules are used in lab preparation of hydrogen

Watch Video Solution

**27.** Give reason for the following:

Purified and dried hydrogen is collected over mercury

Watch Video Solution

**28.** Give reason for the following:

The end of the thistle funnel should be dipped under acid.

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**29.** Give reason for the following:

Dilute sulphuric acid cannot be replaced by concentrated acid in the preparation of hydrogen.

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## Exercise 6 C

**1.** Where does hydrogen occur in free state ?

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**2.** How did the name 'hydrogen' originate?

Watch Video Solution

**3.** Hydrogen can be prepared with the help of cold water. Give a reaction of hydrogen with :

a monovalent metal

Watch Video Solution

**4.** Hydrogen can be prepared with the help of cold water. Give a reaction of hydrogen with :

a divalent metal.

Watch Video Solution

**5.** Which metal is preferred for preparing hydrogen from:

cold water?

Write balanced equation.

Watch Video Solution

**6.** Which metal is preferred for preparing hydrogen from:

hot water ?

Write balanced equation.

Watch Video Solution

**7.** Which metal is preferred for preparing hydrogen from:

steam ?

Write balanced equation for each case.

Watch Video Solution

**8.** Hydrogen may be prepared in the laboratory by the action of a metal with an acid.

Which of the metals copper, zinc, magnesium or sodium would be the most suitable ?

Watch Video Solution

**9.** Hydrogen may be prepared in the laboratory by the action of a metal with an acid.

Which of the acids dilute sulphuric, concentrated sulphuric, dilute nitric and concentrated nitric would you choose ? Explain why you would not use the acids you reject.

Watch Video Solution

**10.** Hydrogen may be prepared in the laboratory by the action of a metal with an acid.

How would you modify your apparatus to collect dry hydrogen ? Which drying agent would you employ for this purpose ?

Watch Video Solution

**11.** Why are the following metals not used in the lab. Preparation of hydrogen?

calcium

Watch Video Solution

**12.** Why are the following metals not used in the lab. Preparation of hydrogen?

iron

Watch Video Solution

**13.** Why are the following metals not used in the lab. Preparation of hydrogen?

aluminium

Watch Video Solution

**14.** Why are the following metals not used in the lab. Preparation of hydrogen?

sodium

Watch Video Solution

**15.** Based on the reactions of water on metals. arrange the following metals in increasing order of reactivity. Iron, sodium, magnesium, zinc, calcium.

Watch Video Solution

**16.** Hydrogen is evolved when dilute HCl reacts with magnesium, but nothing happens in the case of mercury and silver. Explain.

Watch Video Solution

**17.** Steam can react with a metal and a non-metal to liberate hydrogen. Give necessary conditions and equations for the same.

Watch Video Solution

**18.** Hydrogen is obtained by displacement from:

dilute sulphuric acid

Write equations using zinc.

Watch Video Solution

**19.** Hydrogen is obtained by displacement from:

dilute hydrochloric acid

Write equations using zinc and Iron.

Watch Video Solution

**20.** Why is copper not used in preparation of hydrogen?

Watch Video Solution

**21.** Give reason for the following:

Though lead is above hydrogen in the activity

series,still it is not used to prepare hydrogen.

Watch Video Solution

**22.** Give reason for the following:

Potassium and sodium are not used for reaction with dilute hydrochloric acid or dilute sulphuric acid in laboratory preparation of hydrogen.

Watch Video Solution

**23.** Name two alkalies that can displace hydrogen. Give balanced equations for the same. Why are the metals you have used considered to have unique nature.

Watch Video Solution

**24.** Complete and balance the following reactions.

$Na + H_2O \rightarrow$ _____ + _____

Watch Video Solution

**25.** Complete and balance the following reactions.

$Ca + H_2O \rightarrow$ _____ + _____

Watch Video Solution

**26.** Complete and balance the following reactions.

$Mg + H_2O \rightarrow$ _____ + _____

Watch Video Solution

**27.** Complete and balance the following reactions.

$Zn + H_2O \rightarrow$ _____ + _____

Watch Video Solution

**28.** Complete and balance the following equation : $Fe + H_2O$

Watch Video Solution

**29.** Complete and balance the following reactions.

$Zn + HCI \rightarrow$ _____ + _____

Watch Video Solution

**30.** Complete and balance the following reactions.

$Al + H_2SO_4 \rightarrow$ _____ + _____

Watch Video Solution

**31.** Complete and balance the following reactions.

$Fe + HCl \rightarrow$ _____ + _____

Watch Video Solution

**32.** Complete and balance the following reactions.

$Zn + NaOH \rightarrow$ _____ + _____

Watch Video Solution

**33.** Complete and balance the following reactions.

$Al + KOH + H_2O \rightarrow$ _____ + _____

Watch Video Solution

**34.** If the following are kept in closed vessels at over $400^\circ C$, what would happen to them iron filings and steam ?

Watch Video Solution

**35.** If the following are kept in closed vessels at over $400^{\circ} C$, what would happen to them hydrogen and magnetic oxide of iron ?

Watch Video Solution

**36.** A metal in the powdered form reacts very slowly with boiling water, but it decomposes steam. Name the metal.

Watch Video Solution

**37.** Write a balanced equation for the reaction of the named metal with (i) boiling water (ii) steam.

Watch Video Solution

**38.** What do you observe when hydrogen gas is passed through soap solution ?

Watch Video Solution

**39.** Under what conditions can hydrogen be made to combine with

nitrogen

Name the products in each case and write the equation for each reaction.

 Watch Video Solution

**40.** Under what conditions can hydrogen be made to combine with

chlorine

Name the products in each case and write the equation for each reaction.

Watch Video Solution

**41.** Under what conditions can hydrogen be made to combine with

sulphur

Name the products in each case and write the equation for each reaction.

Watch Video Solution

**42.** Under what conditions can hydrogen be made to combine with

oxygen

Name the products in each case and write the equation for each reaction.



Watch Video Solution

**43.** When hydrogen is passed over a black solid compound A, the products are 'a colourless liquid' and 'a reddish brown metal B.' Substance B is divided into two parts, each

placed in separate test tubes. Dilute HCl is added to one part of substance B and dilute HNO3, to the other.

Name the substances A and B.

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**44.** When hydrogen is passed over a black solid compound A, the products are .a colourless liquid. and .a reddish brown metal B..

Substance B is divided into two parts, each

placed in separate test tubes.

Dilute HCl is added to one part of substance B and dilute $HNO_3$ to the other.

Give two tests for the colourless liquid formed in the experiment. What does it signifies ?

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**45.** When hydrogen is passed over a black solid compound A, the products are 'a colourless liquid' and 'a reddish brown metal B.' Substance B is divided into two parts, each

placed in separate test tubes. Dilute HCl is added to one part of substance B and dilute $HNO_3$ to the other.

What happens to substance A when it reacts with hydrogen ? Give reasons for your answer.

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**46.** When hydrogen is passed over a black solid compound A, the products are 'a colourless liquid' and 'a reddish brown metal B.' Substance B is divided into two parts, each

placed in separate test tubes. Dilute HCl is added to one part of substance B and dilute HNO, to the other.

Write an equation for the reaction between hydrogen and substance A.

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**47.** When hydrogen is passed over a black solid compound A, the products are 'a colourless liquid' and 'a reddish brown metal B.' Substance B is divided into two parts, each

placed in separate test tubes. Dilute HCl is added to one part of substance B and dilute $HNO_3$ to the other.

Is there any reaction between substance B and dilute hydrochloric acid ? Give reasons for your answer.

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Exercise 6 D

**1.** Describe briefly the ionic concept of oxidation and reduction. Give an equation to illustrate.

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**2.** Is it essential that oxidation and reduction must occur side by side in a chemical reaction ? Explain.

Watch Video Solution

**3.** State, giving reasons, whether the substances printed in bold letters have been oxidised or reduced.

$PbO + CO \rightarrow Pb + CO_2$

Watch Video Solution

**4.** State, giving reasons, whether the substances printed in bold letters have been oxidised or reduced.

$Mg + 2HCl \rightarrow MgCl_2 + H_2$

Watch Video Solution

**5.** State, giving reasons, whether the substances printed in bold letters have been oxidised or reduced.

$H_2S + Cl_2 \rightarrow 2HCl + S$

Watch Video Solution

**6.** State, giving reasons, whether the substances printed in bold letters have been

oxidised or reduced.

$Cl_2 + H_2S \rightarrow 2HCI + S$

Watch Video Solution

**7.** State whether the following conversions are oxidation or reduction reactions.

$PbO_2 + SO_2 \rightarrow PbSO_4$

Watch Video Solution

**8.** State whether the following conversions are oxidation or reduction reactions.

$Cu^{2+} + 2e^- \rightarrow Cu$

Watch Video Solution

**9.** State whether the following conversions are oxidation or reduction reactions.

$K \rightarrow K^+ + e^-$

Watch Video Solution

**10.** State whether the following conversions are oxidation or reduction reactions.

$2C1^{-} - 2e^{-} \rightarrow CI_2$

Watch Video Solution

**11.** In the following reaction : $A^{+} + B \rightarrow A + B^{+}$. Write half reactions for this reaction and name :

oxidizing agent

Watch Video Solution

**12.** In the following reaction : $A^+ + B \rightarrow A + B^+$. Write half reactions for this reaction and name :

substance oxidized

Watch Video Solution

**13.** In the following reaction : $A^+ + B \rightarrow A + B^+$. Write half reactions for this reaction and name :

reducing agent.

Watch Video Solution

**14.** Divide the following redox reactions into oxidation and reduction half reactions.

$Zn + Pb^{2+} \rightarrow Zn^{2+} + Pb$

Watch Video Solution

**15.** Divide the following redox reactions into oxidation and reduction half reactions.

$Zn + Cu^{2+} \rightarrow Zn\&(2+) + Cu$

Watch Video Solution

**16.** Divide the following redox reactions into oxidation and reduction half reactions.

$Cl_2 + 2Br^- \rightarrow Br_2 + 2Cl^-$

Watch Video Solution

**17.** Write the equation in the ionic form

$CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

Watch Video Solution

**18.**

$$CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$$

Divide the above equation into oxidation and reduction half reactions.

Watch Video Solution

**19.** Give reasons :

Hydrogen is collected by the downward displacement of water and not of air, even though it is lighter than air.

Watch Video Solution

**20.** Give reasons :

A candle brought near the mouth of a jar containing hydrogen gas starts burning but is extinguished when pushed inside the jar.

Watch Video Solution

**21.** Give reasons :

Apparatus for laboratory preparation of

hydrogen should be air tight and away from a naked flame.

Watch Video Solution

**22.** Select the odd one out and justify your answer.

Zn, Fe, Mg and Na

Watch Video Solution

**23.** Select the odd one out and justify your answer.

$SO_2, H_2S, NH_3$ and $CO_2$

Watch Video Solution

**24.** Select the odd one out and justify your answer.

Fe, Zn, Cu and Mg

Watch Video Solution

**25.** Select the odd one out and justify your answer.

Fe, Pb, Al and Zn

Watch Video Solution

**26.** Helium is preferred to hydrogen for filling balloons because it is :

A. lighter than air

B. almost as light as hydrogen

C. non-combustible

D. inflammable.

**Answer:**

Watch Video Solution

**27.** Reacting with water, an active metal produces

A. oxygen

B. nitric acid

C. a base

D. none of these.

**Answer:**

Watch Video Solution

**28.** Name the following

A metal oxide that can be reduced by hydrogen.

A. A1,03

B. Cuo

C. CaO

D. Na,

**Answer:**

Watch Video Solution

**29.** Which of the following statements about hydrogen is incorrect?

A. It is an inflammable gas

B. It is the lightest gas.

C. It is not easily liquefied.

D. It is a strong oxidizing agent.

**Answer:**

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**30.** For the reaction $PbO + H_2 \rightarrow Pb + H_2O$, which of the following statements is wrong?

A. $H_2$ is the reducing agent.

B. PbO is the oxidizing agent.

C. PbO is oxidized to Pb

D. $H_2$ is oxidized to H,O.

**Answer:**

Watch Video Solution

**31.** Which metal gives hydrogen with all of the following: water, acids, alkalis ?

(A) Fe

(B) Zn

(C) Mg

(D) Pb

A. Fe

B. Zn

C. Mg

D. Pb

**Answer:**

Watch Video Solution

**32.** Which of the following metals does not liberate hydrogen from acids?

A. Iron

B. Copper

C. Magnesium

D. Zinc

**Answer:**

Watch Video Solution

**33.** When CuO reacts with hydrogen, ..... is reduced and ..... is oxidized to .....

Watch Video Solution

**34.** Hydrogen is..... soluble in water.

Watch Video Solution

**35.** Metals like ..... , ..... and ..... give $H_2$ with steam.

Watch Video Solution

**36.** Sodium ..... reacts smoothly with cold water.

Watch Video Solution

**37.** A metal.. hydrogen in the activity series gives hydrogen with ..... acid or ..... acid.

Watch Video Solution

**38.** Correct the following statements :

Hydrogen is separated from CO by passing the mixture through caustic potash solution.

Watch Video Solution

**39.** Correct the following statements :

All metals react with acids to give hydrogen.

Watch Video Solution

**40.** Correct the following statements :

Hydrogen is dried by passing it through conc. $H_2SO_4$.

Watch Video Solution

**41.** Correct the following statements :

Very dilute nitric acid reacts with iron to produce hydrogen.

Watch Video Solution

**42.** Correct the following statements :

Conc. $H_2SO_4$ reacts with zinc to liberate hydrogen.

Watch Video Solution

**43.** Name :

an oxidizing agent that does not contain oxygen.

Watch Video Solution

**44.** Name :

a substance that oxidizes concentrated HCl to chlorine.

Watch Video Solution

**45.** Name :

a substance that will reduce aqueous Iron (III) ions to Iron (II) ions.

Watch Video Solution

**46.** Name :

a liquid that is an oxidizing as well as a reducing agent.

Watch Video Solution

**47.** Name :

a gas that is an oxidizing as well as a reducing agent.

Watch Video Solution

**48.** Name :

a solid that is an oxidizing agent.

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## Topic 1 Hydrogen And Its Laboratory Preparation 1 Mark Questions

**1.** Hydrogen is..... soluble in water.

Watch Video Solution

**2.** Sodium ..... reacts smoothly with cold water.

Watch Video Solution

**3.** Which of the following statements about hydrogen is incorrect?

A. It is an inflammable gas

B. It is the lightest gas.

C. It is not easily liquefied.

D. It is a strong oxidizing agent.

**Answer: D**

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**4.** Which metal gives hydrogen with all of the following: water, acids, alkalis ?

(A) Fe

(B) Zn

(C) Mg

(D) Pb

A. Iron

B. Zinc

C. Magnesium

D. Lead

**Answer: B**

Watch Video Solution

**5.** Why does hydrogen show dual nature ?

Watch Video Solution

**6.** Why was hydrogen called 'inflammable air' ?

 Watch Video Solution

**7.** Which metal is preferred for preparation of hydrogen from acid ?

 Watch Video Solution

**8.** Why is hot concentrated sulphuric acid not used in the preparation of hydrogen ?

Watch Video Solution

**9.** Give equations to express the reaction between calcium and water.

Watch Video Solution

**10.** Inert solvent is used for keeping sodium?

Watch Video Solution

**11.** Why is sodium kept immersed in kerosene oil?

Watch Video Solution

**12.** Provide the reason: Preferential use of Zinc in granulated form to prepare hydrogen in lab.

Watch Video Solution

**13.** Give reasons :

Conc. sulphuric acid is used as drying agent.

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## Topic 1 Hydrogen And Its Laboratory Preparation 2 Mark Questions

**1.** Justify the position of hydrogen in the periodic table on the basis of its electronic configuration.

Watch Video Solution

**2.** In what respect does hydrogen differ from:

alkali metals

Watch Video Solution

**3.** In what respect does hydrogen differ from:

halogens?

Watch Video Solution

**4.** Write balanced equations and give your observations when the following metals react :

Sodium with cold water

Watch Video Solution

**5.** Write balanced equations and give your observations when the following metals react :

Calcium with cold water

Watch Video Solution

**6.** Write balanced equations and give your observations when the following metals react : Magnesium with boiling water

Watch Video Solution

**7.** Write balanced equations and give your observations when the following metals react : Magnesium with steam.

Watch Video Solution

**8.** From the knowledge of activity series, name a metal which shows the following properties

It reacts readily with cold water

Watch Video Solution

**9.** From the knowledge of activity series, name a metal which shows the following properties

It displaces hydrogen from hot water

Watch Video Solution

**10.** From the knowledge of activity series, name a metal which shows the following properties

It displaces hydrogen from dilute HCI

Watch Video Solution

**11.** From the knowledge of activity series, name a metal which shows the following properties

It forms a base which is insoluble in water.

Watch Video Solution

**12.** Which test should be made before collecting hydrogen in a gas jar?

Watch Video Solution

**13.** Why is nitric acid not used in the preparation of hydrogen?

Watch Video Solution

**14.** Hydrogen is evolved when dilute HCl reacts with magnesium, but nothing happens in the case of mercury and silver. Explain.

Watch Video Solution

**15.** What happens when a metal and a non metal reacts with steam? Name the product formed in each case.

Watch Video Solution

**16.** Give reason for the following:

Though lead is above hydrogen in the activity series, it does not react wittı dilute hydrochloric acid or dilute sulphuric acid.

Watch Video Solution

**17.** Give reason for the following:

Potassium and sodium are not used for reaction with dilute hydrochloric acid or dilute sulphuric acid in laboratory preparation of hydrogen.

Watch Video Solution

**18.** If the following are kept in closed vessels at over $400^{\circ} C$, what would happen to them iron filings and steam ?

Watch Video Solution

**19.** If the following are kept in closed vessels at over $400^{\circ} C$, what would happen to them hydrogen and magnetic oxide of iron ?

Watch Video Solution

**20.** (a) A metal in the powdered form reacts very slowly with the boiling water, but it decomposes in steam. Name the metal.

(b) Write a balanced equation for the reaction occurring in (a).

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**21.** Write the composition of Sodium amalgam

Watch Video Solution

**22.** What is the composition of water? In what volume its elements combine ?

Watch Video Solution

**23.** Name any one metal which is preferred for the preparation of hydrogen from cold water

Watch Video Solution

**24.** Which metal is preferred for preparation of hydrogen from acid ?

Watch Video Solution

## Topic 1 Hydrogen And Its Laboratory Preparation 3 Mark Questions

**1.** Compare hydrogen with alkali metals on the basis of:

Ion formation

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**2.** Compare hydrogen with alkali metals on the basis of:

Reducing Power

Watch Video Solution

**3.** Compare hydrogen with alkali metals on the basis of:

Reaction with oxygen

Watch Video Solution

**4.** Give the general group study of hydrogen with reference

valence electrons

Watch Video Solution

**5.** Give the general group study of hydrogen with reference

burning

Watch Video Solution

**6.** Give the general group study of hydrogen with reference

reducing power.

Watch Video Solution

**7.** Write the reaction of steam with red hot iron.

Watch Video Solution

**8.** Why steam with red hot iron reaction considered a reversible reaction ?

Watch Video Solution

**9.** How can the reaction proceed continuously?

View Text Solution

**10.** Write balanced equations for the reaction of dilute hydrochloric acid with iron.

Watch Video Solution

**11.** Write balanced equations for the following:

Zinc reacts with caustic soda solution

Watch Video Solution

**12.** Write balanced equations for the following:

Lead reacts with potassium hydroxide

Watch Video Solution

**13.** Under what conditions iron reacts with water.

Watch Video Solution

**14.** Give the balanced equation of the reaction.

View Text Solution

**15.** What is noticed if the products are not allowed to escape ?

Watch Video Solution

**16.** Hydrogen can be prepared with the metal zinc by using :

acid

Give an equation in each case.

Watch Video Solution

**17.** Hydrogen can be prepared with the metal zinc by using :

alkali

Give an equation in each case.

Watch Video Solution

**18.** Hydrogen can be prepared with the metal zinc by using :

water

Give an equation in each case.

Watch Video Solution

**19.** Hydrogen is prepared by Bosch process ?

Write the balanced equations of the reactions with conditions.

Watch Video Solution

**20.** Hydrogen is manufactured by Bosch Process'.

How can you obtain hydrogen from a mixture of hydrogen and carbon monoxide ?

Watch Video Solution

**21.** A small piece of calcium metal is put into a small trough containing water. There is effervescence and white turbidity is formed. Name the gas formed in the reaction. How would you test the gas ?

Watch Video Solution

**22.** A small piece of calcium metal is put into a small trough containing water. There is

effervescence and white turbidity is formed.

Write an equation for the reaction.

Watch Video Solution

**23.** A small piece of calcium metal is put into a small trough containing water. There is effervescence and white turbidity is formed.

What do you observe when a few drops of red litmus solution are added to the turbid solution ?

Watch Video Solution

**24.** Give balanced equations to show the preparation of hydrogen by the following:

cold water.

Watch Video Solution

**25.** Which metal is preferred for preparing hydrogen from:

hot water ?

Write balanced equation.

Watch Video Solution

**26.** Give balanced equations to show the preparation of hydrogen by the following:

steam

Watch Video Solution

**27.** Name two alkalies that can displace hydrogen. Give balanced equations for the same. Why are the metals you have used considered to have unique nature.

Watch Video Solution

**28.** (i)Name the industrial method for the production of hydrogen gas.

(ii)Name the catalyst used in the above process.

Watch Video Solution

**29.** Write the balanced chemical equation for the production of water gas.

Watch Video Solution

**30.** Write a balanced chemical equation

Action of hot water on heated magnesium

Watch Video Solution

**31.** Write balanced chemical equation for each of the

Action of dilute hydrochloric acid on iron.

Watch Video Solution

**32.** Write a balanced chemical equation

Action of sodium hydroxide solution on aluminium.

Watch Video Solution

**33.** Balance the equations : $P + O_2 \rightarrow P_2O_5$

Watch Video Solution

**34.** Balance the equations :

$C_2H_4 + O_2 \rightarrow CO_2 + H_2O$

Watch Video Solution

**35.** Balance the equations :

$P_2O_5 + H_2O \rightarrow H_3PO_4$

Watch Video Solution

## Topic 1 Hydrogen And Its Laboratory Preparation 5 Mark Questions

**1.** Compare hydrogen and halogens on the basis of:

physical state

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**2.** Compare hydrogen and halogens on the basis of:

ion formation

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**3.** Compare hydrogen and halogens on the basis of:

valency

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**4.** Compare hydrogen and halogens on the basis of reaction with oxygen

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**5.** Which metal is preferred for preparation of hydrogen from water?

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**6.** Why Zinc and aluminium are considered to have unique nature. Give balanced equations to support your answer.

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**7.** For laboratory preparation of hydrogen, give the following:

materials used

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**8.** For laboratory preparation of hydrogen, give the following:

method of collection

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**9.** For laboratory preparation of hydrogen, give the following:

chemical equation

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**10.** For laboratory preparation of hydrogen, give the following:

a) materials used

b)method of collection

c) chemical equation

d) fully labelled diagram

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**11.** Name the impurities present in hydrogen prepared in the laboratory.

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**12.** Name the impurities present in hydrogen prepared in the laboratory. Write the balanced equation to show how these impurities be removed.

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**13.** Complete and balance the following reactions.

$Na + H_2O \rightarrow$ _____ + _____

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**14.** Complete and balance the following reactions.

$Ca + H_2O \rightarrow$ _____ + _____

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**15.** Complete and balance the following equation : $Mg + H_2O \rightarrow$

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**16.** Complete and balance the following reactions.

$Zn + H_2O \rightarrow$ _____ + _____

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**17.** Complete and balance the following equation : $Fe + H_2O$

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**18.** Complete and balance the equations .

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

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**19.** Complete and balance the following reactions.

$Al + H_2SO_4 \rightarrow$ _____ + _____

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**20.** Complete and balance the following reactions.

$Fe + HCl \rightarrow$ _____ + _____

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**21.** Complete and balance the following reactions.

$Zn + NaOH \rightarrow$ _____ + _____

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**22.** Complete and balance the following reactions.

$Al + KOH + H_2O \rightarrow$ _____ + _____

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**23.** Write down what happens when iron, copper and magnesium metals are added to an aqueous solution of Zinc sulphate ?

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**24.** Arrange these metals in descending order of reactivity

Fe,Zn,Na,Cu,Ag

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## Topic 2 Properties Of Hydrogen Oxidation Nd Reduction 1 Mark Questions

**1.** When CuO reacts with hydrogen, ..... is reduced and ..... is oxidized to .....

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**2.** Metals like _____, _____ and give $H_2$ with steam. (iron, magnesium, aluminium, sodium, calcium)

Watch Video Solution

**3.** A metal.. hydrogen in the activity series gives hydrogen with ..... acid or ..... acid.

Watch Video Solution

**4.** By increasing the pressure on the volume of an enclosed gas at constant (i) _____ the volume of the gas (ii)___ This is given by (iii) _____law

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**5.** Helium is preferred to hydrogen for filling balloons because it is :

A. heavier than air

B. easy to fill in balloons

C. non-combustible

D. inflammable

**Answer: C**

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**6.** Reacting with water, an active metal produces

A. oxygen

B. nitric acid

C. a base

D. none of these

**Answer: C**

 Watch Video Solution

**7.** Name the following

A metal oxide that can be reduced by hydrogen.

A. $Al_2O_3$

B. CuO

C. CaO

D. $Na_2O$

**Answer: B**

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**8.** For the reaction $PbO + H_2 \rightarrow Pb + H_2O$, which of the following statements is wrong?

A. $H_2$ is the reducing agent.

B. PbO is the oxidizing agent.

C. PbO is oxidized to Pb

D. $H_2$ is oxidized to $H_2O$

**Answer: C**

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**9.** Which of the following metals does not liberate hydrogen from acids?

A. Iron

B. Copper

C. Magnesium

D. Zinc

**Answer: B**

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**10.** Select the odd one out and justify your answer.

Zn, Fe, Mg and Na

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**11.** Select the odd one out and justify your answer.

$SO_2, H_2S, NH_3$ and $CO_2$

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**12.** Select odd one and justify your answer :

$Mg, Zn, Fe, Cu$

Watch Video Solution

**13.** Select the odd one out and justify your answer

Fe , Pb , Al and Zn

Watch Video Solution

**14.** State whether the following conversions are oxidation or reduction reactions.

$PbO_2 + SO_2 \rightarrow PbSO_4$

 Watch Video Solution

**15.** State whether the following conversions are oxidation or reduction reactions.

$K \rightarrow K^+ + e^-$

 Watch Video Solution

**16.** What do you observe when hydrogen gas is passed through soap solution ?

Watch Video Solution

**17.** Concentrated sulphuric acid is not used to dry hydrogen.

Watch Video Solution

**18.** State whether the compounds shown in bold letters are oxidised or reduced. Provide reasons also.

$CuO + H_2 \rightarrow Cu + H_2O$

Watch Video Solution

**19.** Give reason: For welding of two metallic pieces, an oxyhydrogen flame is used.

Watch Video Solution

**20.** Give reasons :

Hydrogen is not used in balloons inspite of being the lightest gas.

Watch Video Solution

**21.** Name :

a solid that is an oxidizing agent.

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## Topic 2 Properties Of Hydrogen Oxidation Nd Reduction 2 Marks Questions

**1.** What do you observe :

A piece of moist blue litmus paper is placed in a gas jar of chlorine.

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**2.** What do you observe when : Action of reducing agents on acidified $K_2Cr_2O_7$

Watch Video Solution

**3.** State, giving reasons, whether the substances printed in bold letters have been oxidised or reduced.

$PbO + CO \rightarrow Pb + CO_2$

Watch Video Solution

**4.** State, giving reasons, whether the substances printed in bold letters have been

oxidised or reduced.

$H_2S + Cl_2 \rightarrow 2HCl + S$

Watch Video Solution

**5.** Give a chemical test for an oxidising agent.

Watch Video Solution

**6.** Give a chemical test for a reducing agent.

Watch Video Solution

**7.** Complete the following word equations :

Sodium hydroxide + zinc $\rightarrow$ hydrogen +.....

Watch Video Solution

**8.** Complete the following word equations :

Calcium + water $\rightarrow$ calcium hydroxide + .....

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**9.** Hydrogen can be prepared with the help of cold water. Give a reaction of hydrogen with :

a monovalent metal

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**10.** Hydrogen can be prepared with the help of cold water. Give a reaction of hydrogen with :

a divalent metal.

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**11.** Hydrogen may be prepared in the laboratory by the action of a metal with an acid.

Which of the metals copper, zinc, magnesium or sodium would be the most suitable ?

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**12.** Hydrogen may be prepared in the laboratory by the action of a metal on an acid.

How would you modify your apparatus to

collect dry hydrogen ? Which drying agent would you employ for this purpose ?

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**13.** Write example of most active metal of activity series

 Watch Video Solution

**14.** Write example of least active non mental of activity series.

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## Topic 2 Properties Of Hydrogen Oxidation Nd Reduction 3 Marks Questions

**1.** Is it essential that oxidation and reduction must occur side by side in a chemical reaction ? Explain.

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**2.** Give reasons : Hydrogen is collected by the downward displacement of water and not of air, even though it is lighter than air.

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**3.** Give reasons :

A candle brought near the mouth of a jar containing hydrogen gas starts burning but is extinguished when pushed inside the jar.

Watch Video Solution

**4.** Give reasons : Apparatus for laboratory preparation of Hydrogen should be air-tight and away from a naked flame.

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**5.** (a)State the position of Hydrogen in the periodic table.

(b)Explain its resemblance to the other members of its group.

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**6.** Comment on the dual position of Hydrogen in the periodic table.

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**7.** Hydrogen may be prepared in the laboratory by the action of a metal with an acid.

Which of the acids dilute sulphuric, concentrated sulphuric, dilute nitric and concentrated nitric would you choose ?

Explain why you would not use the acids you reject.

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**8.** Give one example of Liquid oxidising agent

Watch Video Solution

**9.** Give one example of each

A gaseous substance which acts as an oxidising as well as a reducing agent.

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**10.** Give one example of Most preferred element/metal for preparing hydrogen in lab.

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**11.** What are oxidising agents ? Give two chemical tests for oxidising agents.

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**12.** Hydrogen is obtained by displacement from

dilute hydrochloric acid

Write equations using zinc.

Why copper does not show similar behaviour?

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**13.** Hydrogen is obtained by displacement from

dilute hydrochloric acid

Write equations using zinc.

Why copper does not show similar behaviour?

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**14.** (i) Write the equation for the laboratory preparation of hydrogen.

(ii) How is the gas collected?

(iii) Write the confirmatory test for Hydrogen.

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## Topic 2 Properties Of Hydrogen Oxidation Nd Reduction 5 Marks Questions

**1.** Describe briefly the ionic concept of oxidation and reduction. Give an equation to illustrate.

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**2.** In the following reaction : $A^+ + B \rightarrow A + B^+$. Write half reactions for this reaction and name :

oxidizing agent

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**3.** In the following reaction : $A^+ + B \rightarrow A + B^+$. Write half reactions for this reaction and name :

substance oxidized

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**4.** In the following reaction : $A^+ + B \rightarrow A + B^+$. Write half reactions for this reaction and name :

reducing agent.

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**5.** Correct the statements

Hydrogen is used as a fuel for rocket propulsion.

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**6.** Correct the following statements :

All metals react with acids to give hydrogen.

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**7.** Correct the statements

Metals adsorb hydrogen.

Watch Video Solution

**8.** Correct the following statements :

Very dilute nitric acid reacts with iron to produce hydrogen.

Watch Video Solution

**9.** Correct the statements

Conc. $H_2SO_4$ reacts with zinc to liberate hydrogen.

Watch Video Solution

**10.** Name :

an oxidizing agent that does not contain oxygen.

Watch Video Solution

**11.** Name a substance which oxidises conc. hydrochloric acid to chlorine.

Watch Video Solution

**12.** Name a substance that will reduce aqueous Iron (III) ions to Iron (II) ions.

Watch Video Solution

**13.** Name :

a liquid that is an oxidizing as well as a reducing agent.

 Watch Video Solution

**14.** Give one example of each

A gaseous substance which acts as an oxidising as well as a reducing agent.

 Watch Video Solution

**15.** Why are the following metals not used in the lab. Preparation of hydrogen?

calcium

Watch Video Solution

**16.** Why are the following metals not used in the lab. Preparation of hydrogen?

iron

Watch Video Solution

**17.** Why are the following metals not used in the lab. Preparation of hydrogen?

aluminium

Watch Video Solution

**18.** Why are the following metals not used in the lab. Preparation of hydrogen?

sodium

Watch Video Solution

**19.** How did the name 'hydrogen' originate?

Watch Video Solution

**20.** What happens when following elements are made to react with hydrogen.

State the conditions required, if any.

Nitrogen

Watch Video Solution

**21.** What happens when following elements are made to react with hydrogen.

State the conditions required, if any.

Chlorine

Watch Video Solution

**22.** What happens when following elements are made to react with hydrogen.

State the conditions required, if any.

Sulphur

Watch Video Solution

**23.** What happens when following elements are made to react with hydrogen.

State the conditions required, if any.

Oxygen

Watch Video Solution

**24.** State the product formed and write the balanced equation to show the reaction between hydrogen and sodium metal.

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**25.** When hydrogen is passed over a black solid compound A, the products are 'a colourless liquid' and 'a reddish brown metal B.' Substance B is divided into two parts, each placed in separate test tubes. Dilute HCl is added to one part of substance B and dilute HNO3, to the other.

Name the substances A and B.

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**26.** When hydrogen is passed over a black solid compound A, the products are .a colourless liquid. and .a reddish brown metal B..

Substance B is divided into two parts, each placed in separate test tubes.

Dilute HCl is added to one part of substance B and dilute $HNO_3$ to the other.

Give two tests for the colourless liquid formed in the experiment. What does it signifies ?

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**27.** When hydrogen is passed over a black solid compound A, the products are 'a colourless liquid' and 'a reddish brown metal B.' Substance B is divided into two parts, each placed in separate test tubes. Dilute HCl is added to one part of substance B and dilute HNO, to the other.

What happens to substance A when it reacts with hydrogen ? Give reasons for your answer.

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**28.** When hydrogen is passed over a black solid compound A, the products are 'a colourless liquid' and 'a reddish brown metal B.' Substance B is divided into two parts, each placed in separate test tubes. Dilute HCl is added to one part of substance B and dilute HNO, to the other.

Write an equation for the reaction between hydrogen and substance A.

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**29.** When hydrogen is passed over a black solid compound A, the products are .a colourless liquid. and .a reddish brown metal B..

Substance B is divided into two parts, each placed in separate test tubes.

Dilute HCl is added to one part of substance B and dilute $HNO_3$ to the other.

Is there any reaction between substance B and dilute hydrochloric acid ? Give reasons for your answer.

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