



# 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 HCl



**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 HCl





[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.



[Watch Video Solution](#)

**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 + .....



[Watch Video Solution](#)

## 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



**Watch Video Solution**

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 ?



**Watch Video Solution**

**20.** Thin strips 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. HCl (iii) Added to an aqueous solution of zinc sulphate



[Watch Video Solution](#)

21. Thin strips 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 deuterium 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.



**Watch Video Solution**

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

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



[Watch Video Solution](#)

## Exercise 6 C

1. Where does hydrogen occur in free state ?



[Watch Video Solution](#)

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.



[Watch Video Solution](#)

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



**Watch Video Solution**

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



**Watch Video Solution**

27. Complete and balance the following reactions.



[Watch Video Solution](#)

28. Complete and balance the following equation :  $\text{Fe} + \text{H}_2\text{O}$



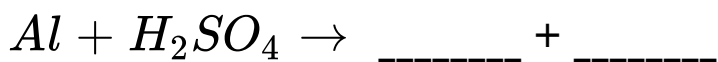
[Watch Video Solution](#)

29. Complete and balance the following reactions.



Watch Video Solution

30. Complete and balance the following reactions.



Watch Video Solution

31. Complete and balance the following reactions.



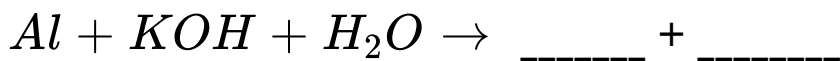
Watch Video Solution

32. Complete and balance the following reactions.



Watch Video Solution

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



**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 HNO<sub>3</sub>, to the other.

Name the substances A and B.



[Watch Video Solution](#)

**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 ?



[Watch Video Solution](#)

**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<sub>3</sub> to the other.

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



[Watch Video Solution](#)

**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<sub>3</sub> to the other.

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



[Watch Video Solution](#)

**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<sub>3</sub> to the other.

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



[Watch Video Solution](#)

**Exercise 6 D**

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



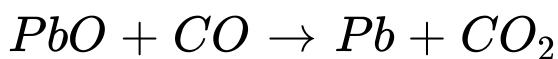
[Watch Video Solution](#)

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



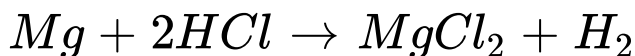
[Watch Video Solution](#)

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



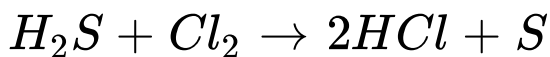
[Watch Video Solution](#)

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



[Watch Video Solution](#)

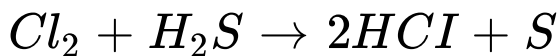
5. State, giving reasons, whether the substances printed in bold letters have been oxidised or reduced.



[Watch Video Solution](#)

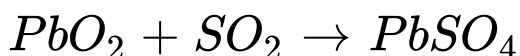
6. State, giving reasons, whether the substances printed in bold letters have been

oxidised or reduced.



[Watch Video Solution](#)

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



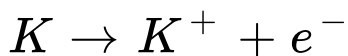
[Watch Video Solution](#)

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



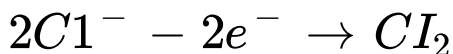
[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



Watch Video Solution

11. In the following reaction :



Write half reactions for this reaction and name :

oxidizing agent



Watch Video Solution

12. In the following reaction :



Write half reactions for this reaction and name :

substance oxidized



[Watch Video Solution](#)

13. In the following reaction :



Write half reactions for this reaction and name :

reducing agent.

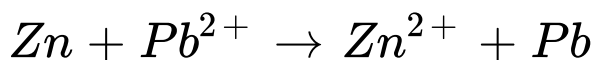






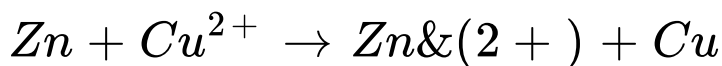
[Watch Video Solution](#)

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



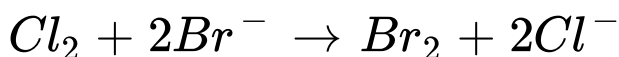
[Watch Video Solution](#)

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



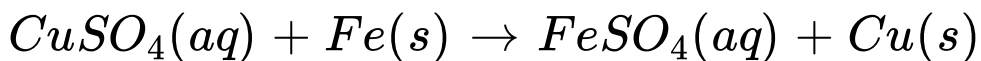
[Watch Video Solution](#)

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



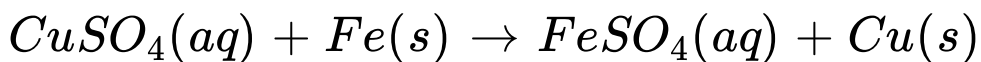
[Watch Video Solution](#)

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



[Watch Video Solution](#)

**18.**



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.  $Al_2O_3$

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:**



**Watch Video Solution**

**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  $H_2O$ .

**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.



**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.



**Watch Video Solution**

## 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**



**Watch Video Solution**

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.



**Watch Video Solution**

## 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 HCl



**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 with 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).



[Watch Video Solution](#)

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



[Watch Video Solution](#)

**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.



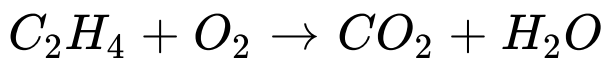
**Watch Video Solution**

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



**Watch Video Solution**

34. Balance the equations :



Watch Video Solution

35. Balance the equations :



Watch Video Solution

Topic 1 Hydrogen And Its Laboratory Preparation  
5 Mark Questions

1. Compare hydrogen and halogens on the basis of:

physical state



[Watch Video Solution](#)

2. Compare hydrogen and halogens on the basis of:

ion formation



[Watch Video Solution](#)

3. Compare hydrogen and halogens on the basis of:

valency



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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

materials used



[Watch Video Solution](#)

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

method of collection



[Watch Video Solution](#)

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

chemical equation



[Watch Video Solution](#)

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

a) materials used

b) method of collection

c) chemical equation

d) fully labelled diagram



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)



13. Complete and balance the following reactions.



Watch Video Solution

14. Complete and balance the following reactions.



Watch Video Solution

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



Watch Video Solution

16. Complete and balance the following reactions.



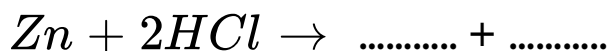
Watch Video Solution

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



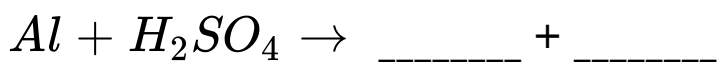
[Watch Video Solution](#)

18. Complete and balance the equations .



[Watch Video Solution](#)

19. Complete and balance the following reactions.



Watch Video Solution

20. Complete and balance the following reactions.



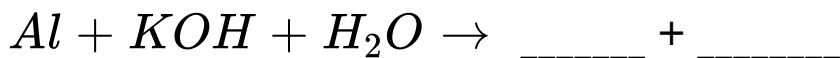
Watch Video Solution

21. Complete and balance the following reactions.



Watch Video Solution

22. Complete and balance the following reactions.



Watch Video Solution

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



**Watch Video Solution**

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

Fe,Zn,Na,Cu,Ag



**Watch Video Solution**

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

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



[Watch Video Solution](#)

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







[Watch Video Solution](#)

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**



[Watch Video Solution](#)

6. Reacting with water, an active metal produces

A. oxygen

B. nitric acid

C. a base

D. none of these

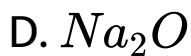
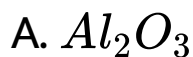
**Answer: C**



**Watch Video Solution**

7. Name the following

A metal oxide that can be reduced by hydrogen.



**Answer: B**



**Watch Video Solution**

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**



**Watch Video Solution**

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

A. Iron

B. Copper

C. Magnesium

D. Zinc

**Answer: B**



**Watch Video Solution**

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

Zn, Fe, Mg and Na



Watch Video Solution

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

$SO_2$ ,  $H_2S$ ,  $NH_3$  and  $CO_2$



Watch Video Solution

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

*Mg, Zn, Fe, Cu*



**Watch Video Solution**

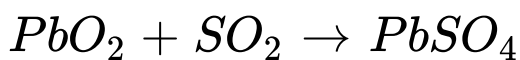
**13.** Select the odd one out and justify your answer

Fe , Pb , Al and Zn



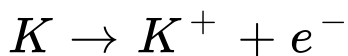
**Watch Video Solution**

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



Watch Video Solution

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



Watch Video Solution



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



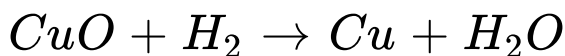
**Watch Video Solution**

**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.



[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.



**Watch Video Solution**

## 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.



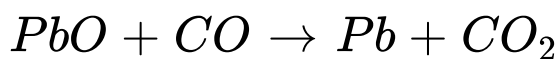
[Watch Video Solution](#)

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



[Watch Video Solution](#)

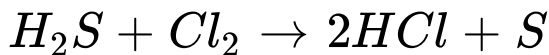
3. State, giving reasons, whether the substances printed in bold letters have been oxidised or reduced.



[Watch Video Solution](#)

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

oxidised or reduced.



[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 + .....



**Watch Video Solution**

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



**Watch Video Solution**

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



**Watch Video Solution**



**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 ?



**Watch Video Solution**

**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 ?



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

## 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.



[Watch Video Solution](#)

2. 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](#)

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.



[Watch Video Solution](#)

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

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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.



[Watch Video Solution](#)

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.



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)



**12.** Hydrogen is obtained by displacement from dilute hydrochloric acid

Write equations using zinc.

Why copper does not show similar behaviour?



**Watch Video Solution**

**13.** Hydrogen is obtained by displacement from dilute hydrochloric acid

Write equations using zinc.

Why copper does not show similar behaviour?



**Watch Video Solution**

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

(ii) How is the gas collected?

(iii) Write the confirmatory test for Hydrogen.



[Watch Video Solution](#)

**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.



[Watch Video Solution](#)

2. In the following reaction :



Write half reactions for this reaction and name :

oxidizing agent



[Watch Video Solution](#)

3. In the following reaction :



Write half reactions for this reaction and name :

substance oxidized



[Watch Video Solution](#)

4. In the following reaction :



Write half reactions for this reaction and name :

reducing agent.



[Watch Video Solution](#)

## 5. Correct the statements

Hydrogen is used as a fuel for rocket propulsion.



[Watch Video Solution](#)

## 6. Correct the following statements :

All metals react with acids to give hydrogen.



[Watch Video Solution](#)

## 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.



[Watch Video Solution](#)

**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 HNO<sub>3</sub>, to the other.

Name the substances A and B.



[Watch Video Solution](#)

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 ?



[Watch Video Solution](#)



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<sub>3</sub> to the other.

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



[Watch Video Solution](#)

**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<sub>3</sub> to the other.

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



**Watch Video Solution**

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.



[Watch Video Solution](#)