



## CHEMISTRY

# BOOKS - CBSE COMPLEMENTARY MATERIAL CHEMISTRY (HINGLISH)

## HYDROGEN

Mcq

1. What is the strength of 20 volume solution of  $H_2O$ ?

A. 5g/L

B. 10g/L

C. 30g/L

D. 60g/L

**Answer: D**



**View Text Solution**

2. The number of water molecule(s) directly bonded to the metal centre in  $CuSO_{4.5}H_2O$  is

A.  $H_3PO_2$

B.  $H_3PO_2$

C.  $H_3PO_4$

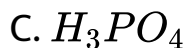
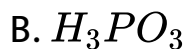
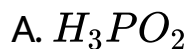
D.  $PH_3$

**Answer: D**



**Watch Video Solution**

3.  $P_4O_{10}$  on hydrolysis produces



**Answer: C**



**View Text Solution**

4.  $D_2O$  has higher value of following physical parameters than  $H_2O$ , except

- A. Molecular Mass
- B. Melting Point
- C. Density
- D. Dielectric Constant

**Answer: D**

 [Watch Video Solution](#)

5. Which one is ionic hydride in nature?

A.  $\text{CrH}$

B.  $\text{NH}_3$

C.  $\text{H}_2\text{O}$

D.  $\text{NaH}$

**Answer: D**



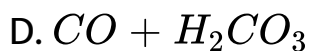
**Watch Video Solution**

**6. Syn-gas is a mixture of**

A.  $\text{CO} + \text{N}_2$

B.  $\text{O}_3$

C.  $\text{CO} + \text{H}_2$

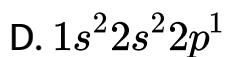
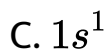
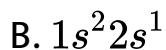
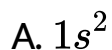


**Answer: C**



**Watch Video Solution**

7. The electronic configuration of 'D' (Isotope of Hydrogen)



**Answer: C**



[Watch Video Solution](#)

8. Which group forms hydride?

A. 6

B. 7

C. 8

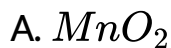
D. 9

**Answer: A**



[View Text Solution](#)

9. When  $MnO_4^-$  reacts with  $H_2O_2$  in basic medium then following species are involved, except



**Answer: D**



[Watch Video Solution](#)

10. Select the incorrect statement for  $H_2O_2$  structure



A. It is non planar

B. O–O bond length is more in gaseous state than in solid phase

C. Both OH bond are in different plane

D. O–O–H bond angle in gas phase is more than in solid phase

**Answer: D**



[Watch Video Solution](#)

**True And False Type Questions**

1.  $H_2O_2$  decomposes slowly on exposure to light.

 [Watch Video Solution](#)

2. What is calgon?

 [Watch Video Solution](#)

3.  $NH_3$  is electron rich hydride.

 [Watch Video Solution](#)

4. Phosphorus form  $PH_5$ .



 [Watch Video Solution](#)

5.  $H_2$  gas cannot reduce  $Pb^{2+}$  ion.

 [Watch Video Solution](#)

6. Hydroformylation of olefins yields aldehydes which further undergoes reduction to give alcohols.

 [View Text Solution](#)

7. The hydrogenation of vegetable oil in the presence of nickel catalyst forms vanaspati ghee.

Give reason.



[Watch Video Solution](#)

8. Ice has cage like structure with air spaces.



[View Text Solution](#)

9. Soft water gives lather with Soap.



[Watch Video Solution](#)

[Fill In The Blanks](#)

1. Cation exchange resin contain large organic molecule with \_\_\_\_ group.

 [Watch Video Solution](#)

2. At atmospheric pressure ice crystallises in \_\_\_\_\_ for.

 [Watch Video Solution](#)

3. Due to high \_\_\_\_\_ of  $H_2O$ ,  $H_2O$  has a very strong hydrating tendency.

 [Watch Video Solution](#)

4. Water is present in  $[Cr(H_2O)_6]^{3+} \cdot 3Cl^-$  in the form of \_\_\_\_\_.

 [Watch Video Solution](#)

5. The H-H bond dissociation enthalpy of  $H_2$  is \_\_\_\_\_, is the highest for a single bond between two atoms of any elements.

 [Watch Video Solution](#)

6. In the Clark's method for softening compound \_\_\_\_\_ is used.

 [Watch Video Solution](#)

7. During photosynthesis  $H_2O$  is \_\_\_\_\_.

 [Watch Video Solution](#)

8.  $BeH_2$  and  $MgH_2$  are ionic and \_\_\_\_\_ in nature.

 [View Text Solution](#)

9. When NaH is electrolysed, then \_\_\_\_\_ is released at anode.

 [Watch Video Solution](#)

10. Hydrated sodium aluminium silicate is \_\_\_\_\_.

 [Watch Video Solution](#)

## Match The Columns

### Column -I

- A. Boiling
- B. Clark's Method
- C. Washing soda
- D. Ion-exchange method

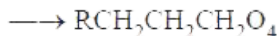
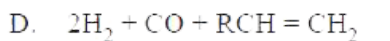
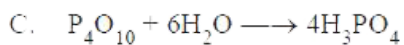
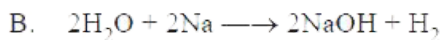
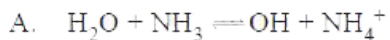
### Column-II

- p.  $\text{CaCO}_3$
- q.  $\text{Mg}(\text{OH})_2$
- r.  $\text{NaAlSiO}_4$
- s.  $\text{NaCl}$

1.

 [View Text Solution](#)



**Column -I****Column-II**

p. Hydroformylation

q. Acid base reaction

r. Redox Reaction

s. Hydrolysis reaction

2.

[View Text Solution](#)**One Word Answer Type Questions**

1. Name the gas evolved when NaOH reacts with zinc.

[Watch Video Solution](#)

2. When brine solution is electrolysed then nature of solution will be?

 [Watch Video Solution](#)

3. What happens when  $Al_4C_3$  reacts with  $D_2O$ ?

 [Watch Video Solution](#)

4. In which medium  $H_2O_2$  act as reducing agent?

 [Watch Video Solution](#)

5. What is the chemical name of calgon's?

 [Watch Video Solution](#)

6. What happens when LiH reacts with  $Al_2C_{16}$ ?

 [Watch Video Solution](#)

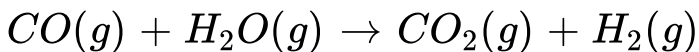
7. What happens when warm aqueous Barium hydroxide solution is electrolysed?

 [Watch Video Solution](#)

8. What type of particles are emitted by Tritium?

 [Watch Video Solution](#)

9. What is the name for the following chemical reaction?



 [Watch Video Solution](#)

10. What is the term used to refer “Transportation and storage of energy in the form of liquid or gaseous dihydrogen

 [Watch Video Solution](#)

## Assertion And Reason Type Questions

1. Statement-1 : HF form extensive hydrogen bonding.

Statement-2 : F has highest tendency to form hydrogen bonding.

- A. If both the statements are True and statement-2 is the correct explanation of statement-1
- B. If both the statements are True and statement-2 is not the correct explanation of statement-1
- C. If statement-1 is true and statement-2 is false
- D. If statement-1 is false and statement-2 is true

**Answer: A**



**View Text Solution**

2. Statement-1 :  $MgCl_2$  solution produces lather with soap.

Statement-2 : Hard water does not produce lather with soap.

A. If both the statements are True and statement-2 is the correct explanation of statement-1

B. If both the statements are True and statement-2 is not the correct explanation of statement-1

C. If statement-1 is true and statement-2 is false

D. If statement-1 is false and statement-2 is true

**Answer: D**



**Watch Video Solution**

**3. Statement -1 : Density of ice is less than water.**

**Statement-2 : Ice has open cage structure.**

A. If both the statements are True and statement-2 is the correct explanation of statement-1

B. If both the statements are True and statement-2 is not the correct explanation of statement-1

C. If statement-1 is true and statement-2 is false

D. If statement-1 is false and statement-2 is true

**Answer: A**

 [Watch Video Solution](#)

4. Statement-1 : Water can act as acid as well as base.

Statement-2 : Water can accept as well as donate  $H^+$  ion.

A. If both the statements are True and statement-2 is the correct explanation of statement-1

B. If both the statements are True and statement-2 is not the correct explanation of statement-1



C. If statement-1 is true and statement-2 is false

D. If statement-1 is false and statement-2 is true

**Answer: A**

 [Watch Video Solution](#)

5. Statement-1 :  $KMnO_4$  act as self indicator.

Statement-2 :  $KMnO_4$  only act as reducing agent.

A. If both the statements are True and statement-2 is  
the correct explanation of statement-1

B. If both the statements are True and statement-2 is  
not the correct explanation of statement-1

C. If statement-1 is true and statement-2 is false

D. If statement-1 is false and statement-2 is true

**Answer: C**



**Watch Video Solution**

6. Statement-1 : Washing soda ( $Na_2CO_3$ ) is use to remove temporary hardness.

Statement-2 : Clark's method is used to remove temporary hardness.

A. If both the statements are True and statement-2 is the correct explanation of statement-1

- B. If both the statements are True and statement-2 is not the correct explanation of statement-1
- C. If statement-1 is true and statement-2 is false
- D. If statement-1 is false and statement-2 is true

**Answer: D**

 [Watch Video Solution](#)

7. Statement-1 : In cation exchange process,  $H^+$  exchanges for  $Na^+$ ,  $Ca^{2+}$ ,  $Mg^{2+}$ .

Statement-2 : In anion exchange process  $OH^-$  exchanges for anion like  $Cl^-$ ,  $HCO_3^-$ ,  $SO_4^{2-}$ .

- A. If both the statements are True and statement-2 is the correct explanation of statement-1
- B. If both the statements are True and statement-2 is not the correct explanation of statement-1
- C. If statement-1 is true and statement-2 is false
- D. If statement-1 is false and statement-2 is true

**Answer: B**



**View Text Solution**

**8.** Statement-1 : When Na reacts with  $H_2O$ ,  $H_2$  gas is release.

Statement-2 :  $P_4O_{10}$  on hydrolysis produce  $H_3PO_3$ .

- A. If both the statements are True and statement-2 is the correct explanation of statement-1
- B. If both the statements are True and statement-2 is not the correct explanation of statement-1
- C. If statement-1 is true and statement-2 is false
- D. If statement-1 is false and statement-2 is true

**Answer: C**



**Watch Video Solution**

9. Statement-1 :  $CH_4$  is a covalent hydrides.

Statement-2 :  $CH_4$  is dectron precise type hydrides.

A. If both the statements are True and statement-2 is the correct explanation of statement-1

B. If both the statements are True and statement-2 is not the correct explanation of statement-1

C. If statement-1 is true and statement-2 is false

D. If statement-1 is false and statement-2 is true

**Answer: A**



**Watch Video Solution**

10. Statement-1 :  $H_2$  gas is use in metallurgical process.

Statement-2 :  $H_2$  gas is use as fuel.

- A. If both the statements are True and statement-2 is the correct explanation of statement-1
- B. If both the statements are True and statement-2 is not the correct explanation of statement-1
- C. If statement-1 is true and statement-2 is false
- D. If statement-1 is false and statement-2 is true

**Answer: B**



**Watch Video Solution**

## 1 Mark Questions

1. Which isotope of hydrogen is radioactive in nature?

 [Watch Video Solution](#)

2.  $H^+$  ions does not exist freely and is always associated with other atoms or molecule. Explain.

 [Watch Video Solution](#)

3. Give the composition of water gas.

 [Watch Video Solution](#)



4. Name the compound whose electrolysis in aqueous state, give high purity (99.95%) dihydrogen.

 [Watch Video Solution](#)

5. Give the main purpose of water gas shift reaction.

 [Watch Video Solution](#)

6. Write the chemical reaction occurring during coal gasification.

 [Watch Video Solution](#)

7. Name the element used in fuel cell for generating electricity.

 [Watch Video Solution](#)

8. Give an example of electron deficient covalent hydride.

 [Watch Video Solution](#)

9. Name the hydrides which have high potential for hydrogen storage.

 [Watch Video Solution](#)

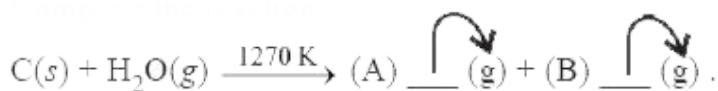
10. Name the groups in d-block elements which do not form metallic hydrides.

 Watch Video Solution

11.  $H_2$  is relatively inert at room temperature. Explain.

 Watch Video Solution

12. Complete the reaction



 Watch Video Solution

**13.** Name the phenomenon as a reason of which water has unusual boiling point.

 [Watch Video Solution](#)

**14.** Draw structure of water.

 [Watch Video Solution](#)

**15.** At atmospheric pressure ices crystallised in the ..... form but at very low temperature it condenses to ..... form.

 [Watch Video Solution](#)

16. Mention the temperature at which density of ice is maximum.

 [Watch Video Solution](#)

17. Density of ice is ..... than density of liquid water.

 [Watch Video Solution](#)

18. How many hydrogen-bonded water molecule(s) are associated in  $CuSO_4 \cdot 5H_2O$ ?

 [Watch Video Solution](#)

19. Name the compound used in Clark's method to remove temporary hardness of water.

 [Watch Video Solution](#)

20. Write the chemical formula of "Calgon".

 [Watch Video Solution](#)

21. A 30% solution of  $H_2O_2$  is marketed as ..... volume.

 [View Text Solution](#)

22. Draw gas phase structure of  $H_2O_2$ .

 [Watch Video Solution](#)

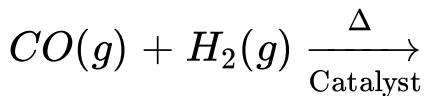
23. Name the organic compound whose auto-oxidation is used to produce  $H_2O_2$  commercially or industrially.

 [Watch Video Solution](#)

24. How is heavy water obtained from ordinary water?

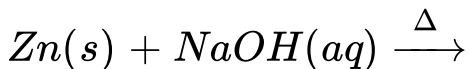
 [Watch Video Solution](#)

1. Complete the reaction :



 [Watch Video Solution](#)

2. Complete the reaction :



 [Watch Video Solution](#)

3. Among  $NH_3$ ,  $H_2O$ , and  $HF$ , which would you expect to have highest magnitude of hydrogen bonding and why?





[Watch Video Solution](#)

4. How do you expect the metallic hydrides to be useful for hydrogen storage? Explain.



[Watch Video Solution](#)

5. How can the production of dihydrogen, obtained from 'Coal gasification', be increased?

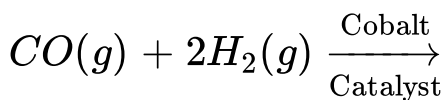


[Watch Video Solution](#)

6. Write the names of isotopes of hydrogen. What is the mass ratio of these isotopes ?

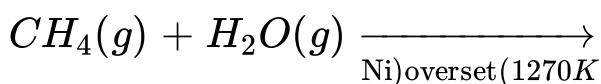
 [Watch Video Solution](#)

7. Complete the reaction :



 [Watch Video Solution](#)

8. Complete the reaction :



 [Watch Video Solution](#)

9. Comment on the reactions of dihydrogen with :

(i) Chlorine, (ii) Sodium.



Watch Video Solution

10. Arrange the following :

LiH, NaH, CsH (In increasing order of ionic character)



Watch Video Solution

11. Arrange the following :

H—H, D—D, F—F (In decreasing order of bond dissociation enthalpy)



Watch Video Solution

12. List two uses of dihydrogen.



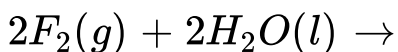
Watch Video Solution

13. Write two reactions to explain amphoteric nature of water .



Watch Video Solution

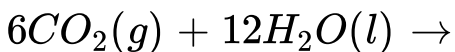
14. Complete the reaction :





[Watch Video Solution](#)

15. Complete the reaction :



[Watch Video Solution](#)

16. What is the difference between the term hydrolysis and hydration.



[Watch Video Solution](#)

17. What do you understand by the term 'auto-prolysis' of water ? What is its significance ?



[Watch Video Solution](#)

**18.** What causes the temporary and permanent hardness of water ?



[Watch Video Solution](#)

**19.** Is demineralised or distilled water useful for drinking purpose? If not, how can it be made useful?



[Watch Video Solution](#)

20. Explain the terms :

Hydrogen economy.

 [Watch Video Solution](#)

21. Write chemical reactions to justify that hydrogen peroxide can function as an oxidising as well as reducing agent.

 [Watch Video Solution](#)

22. Compare the structure of  $H_2O$  and  $H_2O_2$

 [Watch Video Solution](#)

23. How does  $H_2O_2$  behave as a bleaching agent?

 [Watch Video Solution](#)

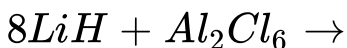
24.  $H_2O_2$  acts as an oxidizing as well as reducing agent.

Why? 3

 [Watch Video Solution](#)

### 3 Mark Questions

1. Complete the chemical reaction :

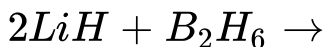






Watch Video Solution

2. Complete the chemical reaction :



Watch Video Solution

3. What do you understand by (i) electron-deficient, (ii) electron-precise and (iii) electron-rich compounds of hydrogen? Provide justification with suitable examples.



Watch Video Solution

4. What do you understand by the term “non-stoichiometric hydrides”? Do you expect this type of the hydrides to be formed by alkali metals? Justify your answer.

 [Watch Video Solution](#)

5. Arrange the following :

$CaH_2$ ,  $BeH_2$ ,  $TiH_2$  (in order of increasing electrical conductance)

 [Watch Video Solution](#)

6. Arrange the following :

$NaH$ ,  $MgH_2$ ,  $H_2O$  (in order of increasing bond dissociation enthalpy)

 [Watch Video Solution](#)

7. Arrange the following :

Li, F, H (in order of increasing ionisation enthalpy)

 [Watch Video Solution](#)

8. What do you understand by the terms :

Syn gas

(ii) Water gas shift reaction

(iii) Producer gas.

 [Watch Video Solution](#)

9. Would gas except the hydrides of N, O and F to have lower boiling point than the hydrides of their subsequent group members ? Give reasons.

 [Watch Video Solution](#)

10. Can phosphorus with outer electronic configuration  $3s^2 3p^3$  form  $PH_5$ ?

 [Watch Video Solution](#)

11. Why and how the hydrogen is regarded as a fuel of future ? Explain.

 [Watch Video Solution](#)

12. Write the reactions when dihydrogen reacts with (i)  $O_2$  (ii)  $N_2$  (iii)  $Cl_2$  under specific conditions.

 [Watch Video Solution](#)

13. Name the hydrides :

Which is non stoichiometric in nature ?

 [Watch Video Solution](#)

Watch Video Solution

14. Name the hydrides :

Which are stoichiometric compounds ?

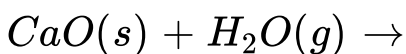
 Watch Video Solution

15. Name the hydrides :

Which has electron rich type hydrides ?

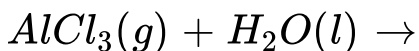
 Watch Video Solution

16. Complete the reaction :



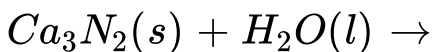
 [Watch Video Solution](#)

17. Complete the reaction :



 [Watch Video Solution](#)

18. Complete the reaction :



 [Watch Video Solution](#)

19. Discuss the principle and method of softening of hard water by synthetic exchange of resin method.



[Watch Video Solution](#)

**20.** What is meant by 'demineralised water' and how it can be obtained?



[Watch Video Solution](#)

**21.** What properties of water make it useful as a solvent? What types of compound can it (i) dissolve and (ii) hydrolyse?



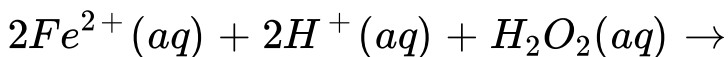
[Watch Video Solution](#)



22. Calculate the strength of 10 volume solution of hydrogen peroxide.

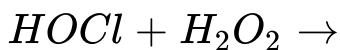
 [Watch Video Solution](#)

23. Complete the reaction :



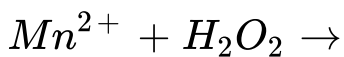
 [Watch Video Solution](#)

24. Complete the reaction :



 [Watch Video Solution](#)

25. Complete the reaction :

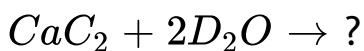


 [Watch Video Solution](#)

26. Give three uses of  $H_2O_2$ .

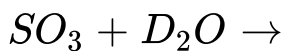
 [Watch Video Solution](#)

27. Complete the following:



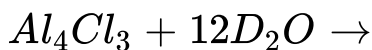
 [Watch Video Solution](#)

28. Complete the reaction :



 [Watch Video Solution](#)

29. Complete the reaction :



 [Watch Video Solution](#)

30. Give the limitations of using  $H_2$  as a fuel.

 [Watch Video Solution](#)

31.  $H_2O_2$  is stored in a wax lined glass or plastic vessels.

Explain an equation showing decomposition of  $H_2O_2$  on exposure to light.



Watch Video Solution

## 5 Mark Questions

1. Answer the following :

Name the most abundant form of hydrogen isotope. [Ans.  $^1_1H$ ]



Watch Video Solution

2. Answer the following :

Name the particles emitted by tritium.

 [Watch Video Solution](#)

3. Answer the following :

Mixture of CO and  $H_2$  is used for preparation .....

 [Watch Video Solution](#)

4. Answer the following :

Name the catalyst used in Haber's Process for manufacture of  $NH_3(g)$ .



[Watch Video Solution](#)

 [Watch Video Solution](#)

5. Name two electron rich hydrides.

 [Watch Video Solution](#)

6. Answer the following :

During Clark's method. Name the compound in which Mg is precipitated out.

 [Watch Video Solution](#)

7. Answer the following :

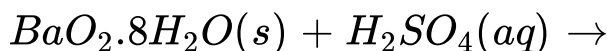
Give the formula of Zeolite used in ion exchange method

to remove permanent hardness of water.

 [Watch Video Solution](#)

8. Answer the following :

Complete the reaction :



 [Watch Video Solution](#)

9. Answer the following :

$\text{H}_2\text{O}_2$  is miscible with water. Assign reason.

 [Watch Video Solution](#)

10. Answer the following :

Name the compound when can be used as a hair beach, mild antiseptic in the form of perhydrol.

 [Watch Video Solution](#)

11. Complete the following chemical equation :

\_\_\_\_\_ + water +  $CaCO_3$  +  $NH_3$  (Ammonia)

 [Watch Video Solution](#)

12. Complete the following chemical equation :

\_\_\_\_\_ + Hydrogen peroxide  $\xrightarrow{H^+}$   $CrO_5$  + \_ \_ \_ .

 [Watch Video Solution](#)



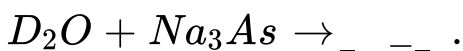
[Watch Video Solution](#)

13. Complete the following chemical equation :



[Watch Video Solution](#)

14. Complete the following chemical equation :



[Watch Video Solution](#)

15. Describe the usefulness of water in biosphere and biological systems.

 [Watch Video Solution](#)

## Hots Questions

1. Calculate the hardness of water sample which contains 0.001 mole of  $MgSO_4$  dissolved per litre of water.

 [Watch Video Solution](#)

2. 2g of Al is treated separately with excess dilute  $H_2SO_4$  and excess NaOH. The ratio of volumes of Hydrogen evolved under similar condition is x y. Find  $\frac{x}{y}$



[Watch Video Solution](#)

3. What mass of CaO will be required to remove the hardness of 1000 litres of water containing 1.62g of  $Ca(HCO_3)_2$  per litre?

 [View Text Solution](#)

4. What is the volume of  $O_2$  liberated at N.T.P. by complete decomposition of 100mL of 2m solution of  $H_2O_2$ ?

 [Watch Video Solution](#)

5. Mention an example in which  $H_2O$  acts as reducing agent.

 [Watch Video Solution](#)

## Unit Test

1. Hydrogen has maximum oxidation state in

 [Watch Video Solution](#)

2. Give one reaction for preparation of hydrogen gas in laboratory.



Watch Video Solution

3. What causes the hardness of water?



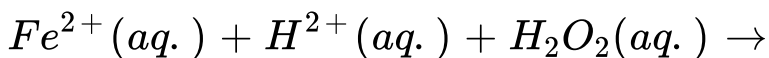
Watch Video Solution

4. Draw the structure of  $H_2O_2$ .



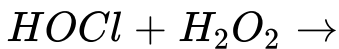
Watch Video Solution

5. Complete the reaction with balancing :



Watch Video Solution

6. Complete the reaction with balancing :



 [Watch Video Solution](#)

7. What is Hydrogen Economy. What are its advantage?

 [Watch Video Solution](#)

8. Explain the following

Atomic hydrogen or oxy-hydrogen torch function for cutting and welding purposes. Why?

 [Watch Video Solution](#)

9. Explain the following

$CaH_2$ ,  $BeH_2$  and  $TiH_2$  arrange in order of increasing electrical conductance and give reason.



[Watch Video Solution](#)

10. Explain the following

Water shows amphoteric behaviour, support by giving appropriate example.



[Watch Video Solution](#)

11. What are different types of hydrides? Give example.



**Watch Video Solution**