



# CHEMISTRY

## BOOKS - SURA CHEMISTRY (TAMIL ENGLISH)

### HYDROGEN

**Evaluation Choose The Best Answer**

1. Which of the following statements about hydrogen 1 is incorrect ?

A. Hydrogen ion  $H_3O^+$  exists freely in solution.

B. Dihydrogen acts as a reducing agent.

C. Hydrogen has three isotopes of which tritium is the most common.

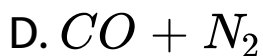
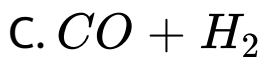
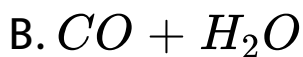
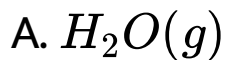
D. Hydrogen never acts as cation in ionic salts.

**Answer: C**



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2. Water gas is :



**Answer: C**



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3. Which one of the following statements is incorrect with regard to ortho and para dihydrogen ?

A. They are nuclear spin isomers

B. Ortho isomer has zero nuclear spin whereas the para isomer has one nuclear spin

C. The para isomer is favoured at low temperatures

D. The thermal conductivity of the para isomer is 50% greater than that of the ortho isomer.

**Answer: B**



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4. Ionic hydrides are formed by

A. halogen

B. chalcogens

C. inert gases

D. group one elements

**Answer: D**



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**5. Tritium nucleus contains**

A.  $1p+0n$

B.  $2p+1n$

C.  $1p+2n$

D. none of these

**Answer: C**



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**6. Non-stoichiometric hydrides are formed by**

A. palladium, vanadium

B. carbon, nickel

C. manganese, lithium

D. nitrogen, chlorine

**Answer: A**



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**7. Assertion :** Permanent hardness of water is removed by treatment with washing soda

**Reason :** Washing soda reacts with soluble calcium and magnesium chlorides and sulphates in hard water to form insoluble carbonates



A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false

D. Both Assertion and reason are false

**Answer: A**



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8. If a body of a fish contains 1.2 g hydrogen in its total body mass, if all the hydrogen is replaced with deuterium then the increase in body weight of the fish will be

A. 1.2g

B. 2.4g

C. 3.6g

D.  $\sqrt{4.8g}$

**Answer: A**



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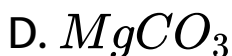
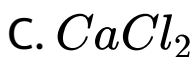
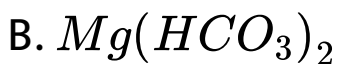
9. The hardness of water can be determined by volumetrically using the reagent

- A. sodium thio sulphate
- B. potassium permanganate
- C. hydrogen peroxide
- D. EDTA

**Answer: D**



10. The cause of permanent hardness of water is due to



**Answer: C**



11. Zeolite used to soften hardness of water is, hydrated

A. Sodium aluminium silicate

B. Calcium aluminium silicate

C. Zinc aluminium borate

D. Lithium aluminium hydride

**Answer: A**



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12. A commercial sample of hydrogen peroxide marked as 100 volume  $H_2O_2$ , it means that.

A. 1 ml of  $H_2O$  will give 100 ml  $O_2$  at STP

B. 1 L of  $H_2O$  will give 100 ml  $O_2$  at STP

C. 1 L of  $H_2O$  will give 22.4 L  $O_2$

D. 1 ml of  $H_2O_2$  will give 1 mole of  $O_2$  at

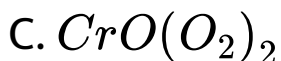
STP

**Answer: A**



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13. When hydrogen peroxide is shaken with an acidified solution of potassium dichromate in presence of ether, the ethereal layer turns blue due to the formation of



D. none of these

**Answer: C**



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14. For decolourisation of 1 molle of acidified  $KMnO_4$  the moles of  $H_2O_2$  required is

A.  $\frac{1}{2}$

B.  $\frac{3}{2}$

C.  $\frac{5}{2}$

D.  $\frac{7}{2}$

**Answer: C**



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15. Volume strength of 1.5 N  $H_2O_2$  is

A. 1.5

B. 4.5

C. 16.8

D. 8.4

**Answer: D**



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16. The hybridisation of oxygen atom in  $H_2O$  and  $H_2O_2$  are, respectively

A.  $sp$  and  $sp^3$

B.  $sp$  and  $sp$

C.  $sp$  and  $sp^2$

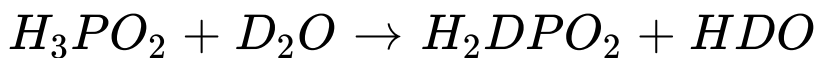
D.  $sp^3$  and  $sp^3$

**Answer: D**



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17. The reaction



indicates that hypo-phosphorus acid is

- A. tribasic acid
- B. dibasic acid
- C. mono basic acid
- D. none of these

**Answer: C**



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18. In solid ice, oxygen atom is surrounded

A. tetrahedrally by 4 hydrogen atoms

B. octahedrally by 2 oxygen and 4  
hydrogen atoms

C. tetrahedrally by 2 hydrogen and 2  
oxygen atoms

D. octahedrally by 6 hydrogen atoms

**Answer: A**



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**19.** The type of H-bonding present in ortho nitro phenol and p-nitro phenol are respectively

A. inter molecular H-bonding and intra molecular H-bonding

B. intra molecular H-bonding and inter molecular H-bonding

C. intra molecular H - bonding and no H - bonding

D. intra molecular H - bonding and intra  
molecular H - bonding

**Answer: B**



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**20.** Heavy water is used as

A. moderator in nuclear reactions

B. coolant in nuclear reactions

C. both (a) and (b)

D. none of these

**Answer: C**



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**21. Water is a**

A. basic oxide

B. acidic oxide

C. amphoteric acid

D. none of these

**Answer: C**



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**Write Brief Answer To The Following Questions**

**1. Explain why hydrogen is not placed with the halogen in the periodic table.**



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2. Discuss the three types of Covalent hydrides



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3. Predict which of the following hydrides is a gas on a solid (a)  $\text{HCl}$  (b)  $\text{NaH}$ . Give your reason.



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4. Write the expected formulas for the hydrides of 4<sup>th</sup> period elements. What is the trend in the formulas? In what way the first two numbers of the series different from the others ?



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5. Write chemical equation for the following reactions.

Reaction of hydrogen with tungsten (VI) oxide  
on heating.



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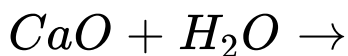
6. Write chemical equation for the following  
reactions.

Hydrogen gas and chlorine gas.



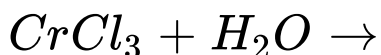
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7. Complete the following chemical reactions and classify them in to (a) hydrolysis (b) redox (c) hydration reactions.



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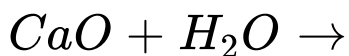
8. Complete the following chemical reactions and classify them in to (a) hydrolysis (b) redox (c) hydration reactions.





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9. Complete the following chemical reactions and classify them in to (a) hydrolysis (b) redox (c) hydration reactions.



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10. Hydrogen peroxide can function as an oxidising agent as well as reducing agent.

substantiate this statement with suitable examples.



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11. Do you think that heavy water can be used for drinking purposes ?



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12. What is water-gas shift reaction?



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**13.** Justify the position of hydrogen in the periodic table?



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**14.** What are isotopes? Write the names of isotopes of hydrogen.



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15. Mention the uses of heavy water .



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16. Explain the exchange reactions of deuterium



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17. How do you convert para hydrogen into ortho hydrogen ?





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**18.** Mention the uses of deuterium.



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**19.** Explain preparation of hydrogen using electrolysis.



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20. A group metal (A) which is present in common salt reacts with (B) to give compound in which hydrogen is present in -1 oxidation state. (B) on reaction with a gas (C) to give universal solvent (D). The compound (D) on reaction with (A) to give (E), a strong base. Identify A, B, C, D and E. Explain the reactions.



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21.  $NH_3$  has exceptionally high melting point and boiling point as compared to those of the hydrides of the remaining element of group 15. Explain.



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22. Why interstitial hydrides have a lower density than the parent metal.



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23. Compare the structures of  $H_2O$  and  $H_2O_2$



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



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25. Arrange  $NH_3$ ,  $H_2O$  and HF in the order of increasing magnitude of hydrogen bonding

and explain the basis for your arrangement.



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**Additional Question Additional Choose The Correct Answer**

1. Ionic hydrides are formed by

A. halogen

B. chalcogens

C. alkalimetals

D. inert gases

**Answer: C**



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2. Volume strength of  $0.5N$ ,  $H_2O_2$  is

A. 2.8

B. 8.4

C. 5.6

D. 16.8

**Answer: A**



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**3. The most abundant element in the universe is \_\_\_\_\_**

A. aluminium

B. mica dihydrogen

C. nitrogen

D. deuterium

**Answer: C**



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4. The number of neutrons in hydrogen atom is \_\_\_\_\_

A. three

B. two

C. one

D. zero



**Answer: D**



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5. \_\_\_\_\_ is known as heavy hydrogen.

A. protium

B. deuterium

C. tritium

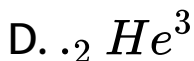
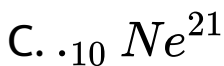
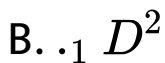
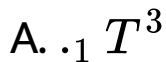
D. both a and b

**Answer: B**



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6. The radioactive isotope used in illumination of wrist watches instead of radium is \_\_\_\_\_



**Answer: A**



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7. Deuterium consists of \_\_\_\_\_

- A. one electron, two proton, three neutron
- B. one electron, one proton, one neutron
- C. two electron, one proton, one neutron
- D. three electron, two proton, one neutron

**Answer: B**



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8. The radioactive isotope of hydrogen is

-----

A. protium

B. deuterium

C. tritium

D. nascent hydrogen

**Answer: C**



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9. The half life period of tritium is \_\_\_\_\_

A. 12.33 secs

B. 12.33 mins

C. 12.33 hrs

D. 12.33 years

**Answer: D**



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10. Ammonia is manufactured by \_\_\_\_ process.

A. Contact

B. Bergius

C. Haber's

D. none of the above

**Answer: C**



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11. \_\_\_\_\_ torches is / are used in cutting and welding of a steel.

A. Oxy acetylene

B. Oxy hydrogen

C. both a and b

D. neither a nor b

**Answer: C**



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12. Hydrogen is used in \_\_\_\_\_

A. Hydrogenation of oils

B. fuel cells

C. gas bags for air ships

D. all of the above

**Answer: D**



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**13.** Which among the following statement/s given below is/ are incorrect regarding hydrogen?

1) It is diatomic in nature.

2) Has only one electron in the outermost shell

3) Very good oxidizing agent

4) Does not form hydrides easily

A. 1,2,& 3

B. only 4

C. only 3

D. only 2

**Answer: C**



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**14.** The conversion of atomic hydrogen to dihydrogen is a \_\_\_\_\_ change.

A. endothermic

B. exothermic

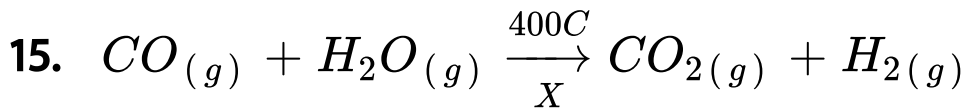
C. photochemical

D. nuclear

**Answer: B**



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'X' is \_\_\_\_\_

A. Nickel

B. Iron

C. Iron oxide

D. Vanadium penta oxide

**Answer: C**



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**16.** Hydrogen bomb is based on the principle of \_\_\_\_\_

A. fission

B. fusion

C. both a and b

D. neither a nor b

**Answer: C**



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**17.** Hydrogen can be obtained from water by reaction with

A. metal oxides

B. non metal oxides

C. metals

D. metal hydrides

**Answer: C**



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**18.** Hydrogen burns in air with a  
\_\_\_\_\_ flame.

A. light bluish

B. yellow

C. green

D. none of these

**Answer: B**



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**19. Which pair are not hydrogen isotopes?**

A. Ortho and para hydrogen

B. Protium and deuterium

C. Deuterium and tritium

D. Tritium and protium

**Answer: A**



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**20.** Ortho and para hydrogen differ in

- A. proton spin
- B. electron spin
- C. nuclear charge
- D. both b and c

**Answer: A**





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21. \_\_\_\_\_ is considered as the potential alternative fuel of the future.

A. hydrogen

B. gasoline

C. biodiesel

D. propane

**Answer: A**



22. The ionisation energy of hydrogen is higher than alkali metals. Pick out the correct reason for the above statement.

- A. Because of smaller size of H.
- B. Presence of  $\leq^-$  in outermost shell.
- C. Presence of one proton in its nucleus.
- D. Absence of neutrons.

**Answer: A**



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23. Hydrogen accepts an electron to attain the inert gas configuration. In this way it resembles \_\_\_\_\_

A. chalcogens

B. halogens

C. transition metals

D. alkali metals

**Answer: B**



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24. Hydrogen acts as a reducing agent and thus resembles

A. halogens

B. chalogens

C. inert gases

D. alkali metals

**Answer: D**



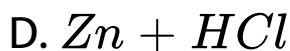
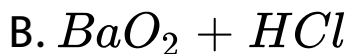
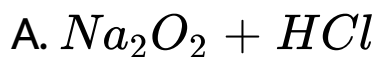
25.  $FeSO_4$  contains \_\_\_\_\_ molecules of water of hydration.

- A. 5
- B. 7
- C. 10
- D. 12

**Answer: B**



26. Which among of the following reaction produces hydrogen ?



**Answer: D**



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27. In which of the following compounds does hydrogen has an oxidation state of -1?



**Answer: D**



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**28.** Assertion : Hydrogen is the simplest atom

Reason : Its nucleus contains only two protons

A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false

D. Both Assertion and reason are false



**Answer: C**



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**29.** Assertion :  $H^+$  ion has a very low polarising power.

Reason : Size of  $H^+$  ion is very large

A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false

D. Both Assertion and reason are false

**Answer: D**



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**30.** Assertion : Hydrogen resembles halogens.

Reason : It has high ionisation energy but still form  $H^+$  ion.

A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false

D. Both Assertion and reason are false

**Answer: B**



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**31.** Which properties of hydrogen are responsible for moderation of the climate and body temperature of living beings?

A. High heat of vapourisation

B. High heat capacity

C. both (a) and (b)

D. None of these

**Answer: C**



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**32.** Consider the following statements

1) Water has high dielectric constant.

2) Water has strong intra molecular hydrogen bonding

3) Water is an Universal solvent which of the

following statement (s) given above is/are not correct

A. 1 & 3

B. only 1

C. 2 & 3

D. only 2

**Answer: D**



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**33.** consider the following statements

1) Hard water forms scum with soap.

2) Hard water lathers easily with soap

3) Hard water is unsuitable for laundry and

boilers which of the following statement (s)

given above is/are correct ?

A. 1 & 2

B. only 1

C. 1 & 3

D. only 2

**Answer: A**



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**34.** Hardness of water is due to \_\_\_\_\_ of calcium and magnesium

A. bicarbonates

B. sulphates

C. chloride

D. all the above

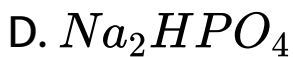
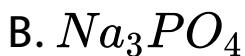
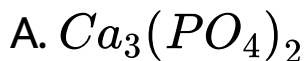


**Answer: D**



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**35.** Which of the following compounds is used for water softening ?



**Answer: C**



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**36.** The structure of water molecule is

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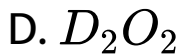
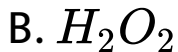
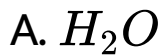
- A. bent
- B. tetrahedral
- C. distorted octahedral
- D. trigonal bi pyramidal

**Answer: A**



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**37.** \_\_\_\_\_ is extensively used as a moderator in nuclear reactors.



**Answer: C**



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**38.** The H-O-H angle in water molecules is about

A.  $90^\circ$

B.  $104.5^\circ$

C.  $109^\circ 28'$

D.  $180^\circ$

**Answer: B**



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**39.** Hardness of water cannot be removed by

A. Treatment with washing soda

B. adding calgon

C. boiling

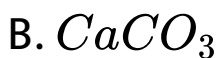
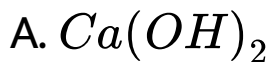
D. addition of chlorine

**Answer: D**



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40. The chemical that is added to water in order to remove temporary hardness is \_\_\_\_\_



**Answer: A**



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41. Name the anions responsible for permanent hardness of water

A. sulphite

B. chloride

C. nitrate

D. both (a) and (b)

**Answer: B**



**42.** Presence of which cation makes the water hard in nature?

A. Ca & Mg

B. Na & Mg

C. Ca & Na

D. Mg & F

**Answer: A**





43. Heavy water is \_\_\_\_\_

A. De-mineralized water

B. De-ionized water

C. ordinary water containing dissolved salts of heavy metals.

D. The compound of heavier isotope of hydrogen with oxygen.

**Answer: D**





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44. The velocity of neutrons in nuclear reactor is slowed down by

A.  $H_2O$

B.  $D_2O$

C. Zinc rods

D. Copper rods

**Answer: B**



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45. The maximum density of water is observed at \_\_\_\_\_

A.  $0^{\circ}\text{C}$

B.  $4^{\circ}\text{C}$

C.  $11.6^{\circ}\text{C}$

D.  $273^{\circ}\text{C}$

**Answer: B**



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**46.** Assertion : Alcohols and carbohydrates are soluble in water

Reason : Water is non-polar solvent.

A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false

D. Both Assertion and reason are false

**Answer: B**



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**47.** Hydrogne peroxide was discovered by

\_\_\_\_\_

A. Chadwick

B. J.J Thomson

C. Urey

D. J.L. Thenard

**Answer: D**



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**48.** Metal hydrides are ionic, covalent or molecular in nature. Among LiH, NaH, KH, RbH, CsH, the correct order of increasing ionic character is .....

A. LiHgtNaHgtCsHgtKHgtRbH

B. LiHltNaHltKHltRbHltCsH

C. RbHgtCsHgtNaHgtKHgtLiH

D. NaHgtCsHgtRbHgtLiHgtKH

**Answer: B**



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**49.**  $H_2O_2$  acts a \_\_\_\_\_ agent.

A. oxidizing

B. reducing

C. both reducing and oxidizing

D. neither reducing nor oxidizing

**Answer: C**



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50.  $H_2O_2$  is a \_\_\_\_\_ acid.

A. mono basic

B. di basic

C. tri basic



D. none

**Answer: B**



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51. LiH is an example of \_\_\_\_\_ hydride.

A. ionic

B. saline

C. covalent

D. both a and b

**Answer: D**



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52. A examples of covalent hydride is

-----



D. all the above

**Answer: B**



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**53.** \_\_\_\_\_ is an example of intra molecular hydrogen bonding.

- A. salicylaldehyde
- B. hydrogen fluoride
- C. para nitro phenol
- D. both a and c

**Answer: A**



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54. HF has \_\_\_\_\_ hydrogen bond.

A. intramolecular

B. intermolecular

C. intrastellar

D. interstellar

**Answer: B**



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55. Acetic acid exist as a \_\_\_\_\_

A. monomer

B. dimer

C. trimer

D. octamer

**Answer: B**



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56. What is the dihedral angle of  $H_2O_2$  in gas and solid phase ?

A.  $111.5^\circ$  and  $90.2^\circ$

B.  $115.1^\circ$  and  $92^\circ$

C.  $92^\circ$  and  $115.1^\circ$

D.  $90.2^\circ$  and  $111.5^\circ$

**Answer: A**



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57.  $H_2O_2$  acts as

A. oxidising agent

B. reducing agent

C. bleaching agent

D. all of these

**Answer: D**



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58. The reaction  $H_2O_2 \rightarrow H_2O + O_2$

represents,

- A. Oxidising of  $H_2O_2$
- B. reducing of  $H_2O$
- C. disproportionation of oxygen
- D. acidic nature of  $H_2O_2$

**Answer: C**



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59.  $H_2O$  and  $H_2O_2$  resemble in

A. Bond angle

B. Hybridization of oxygen

C. structure

D. Oxidation state of oxygen

**Answer: B**



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60. Statement I : The O-O bond length in  $H_2O_2$  is shorter than that of  $O_2F_2$

Statement II :  $H_2O_2$  is an ionic compound.

A. Both statement I and II are true but statement II explains statement I

B. Both statement I and II are true but statement II does not explain statement I

C. Statement I is true but statement II is false.

D. Both the statements are false.

**Answer: D**



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**61.** Ionic hydrides are usually

A. Good conductors of electricity in solid state

B. volatile

C. non-crystalline

## D. stoichiometric compounds

**Answer: D**



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**62.** Intermolecular H-bonding is present in

\_\_\_\_\_

A. HF

B.  $H_2O$

C.  $C_2H_5OH$

D. All of these

**Answer: D**



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**63.** Which one of the following bond is stronger ?

A. Covalent

B. H-bond

C. Vanderwaal's force

D. All of these

**Answer: A**



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**64.** The intramolecular hydrogen bonding in molecules lead to \_\_\_\_\_

A. high melting point

B. low boiling point

C. high boiling point

D. high solubility in water

**Answer: B**



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**65.** Assertion : Industrial method of preparation of  $H_2O_2$  involves 2-ethylanthraquinol.

Reason : The process is cyclic.

A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false

D. Both Assertion and reason are false

**Answer: A**



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66. Intramolecular H-bonding is present in \_\_\_\_\_

- A. o-nitrophenol
- B. salicylic acid
- C. salicylaldehyde
- D. all of these

**Answer: D**



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67. Which of the following is incorrect?

A. Hydrogen forms unipositive ion like alkali metals

B. Hydrogen forms halides, oxides peroxides and sulphides like alkali metals

C. Hydrogen also acts as a reducing agent

D. Hydrogen has ionization energy ranging of alkali metals.

**Answer: D**



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**68.** Which is the only isotope that does not contain a neutron?

A. Protium

B. Deuterium

C. Tritium

D. Chlorine-35

**Answer: A**



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**69.** The equilibrium shifts in favour of para hydrogen when the temperature is

A. highered

B. lowered

C. increased

D. a & c

**Answer: B**



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**70.** Ortho hydrogen has magnetic moment \_\_\_\_\_ that of a proton.

A. twice

B. three times

C. four times

D. six times

**Answer: A**



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**71.** Which explosive reaction is used in fuel cells to generate electricity?

- A. Reaction of hydrogen with carbon
- B. Reaction of hydrogen with oxygen
- C. Reaction of carbon with oxygen
- D. Reaction of carbon with nitrogen

**Answer: B**



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**72.** What is responsible for the high melting and boiling points of water?

A. Hydrogen bonding

B. Strong forces

C. High reactivity

D. b & c

**Answer: A**



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**73.** In another way to soften the hard water is by using a process called \_\_\_\_\_

- A. Ion-exchange
- B. Osmosis
- C. Reverse Osmosis
- D. Ionic Pressure



**Answer: A**



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**74.** The exchange reactions are useful in determining the number of \_\_\_\_ present in a given compound

- A. Hydrogen atoms
- B. Ionic hydrogens
- C. Oxygen atoms
- D. Ionic oxygens

**Answer: B**



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**75.** On an industrial scale, hydrogen peroxide is prepared exclusive by autoxidation of \_\_\_\_\_

A. 2-alkylanthraquinol

B. 2-quinol

C. 2-anthra quinol

D. 2-alkyl quinol

**Answer: A**



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76. \_\_\_\_\_ density of ice compared with water at  $0^{\circ} C$

A. higher

B. lower

C. retained

D. more

**Answer: B**



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## **Additional Short Answer**

**1. What is meant by intramolecular hydrogen bond? Give one example**



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2. Name the isotopes of hydrogen.



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3. What is ortho hydrogen?



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4. What is para hydrogen?



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5. How does iron react with steam ?



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6. Write short notes on Deuterium



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7. Which is the radio active isotope of Hydrogen? Write a note on it.



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8. Give two uses of Tritium.



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9. Explain the large scale production of Hydrogen.



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10. Write a note on Haber's process.



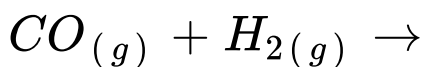
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11. What is hydrogenation? What is its industrial application?



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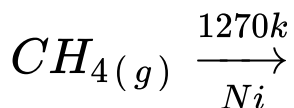
12. Complete the following reactions and balance them:



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



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**14.** How is deuterium prepared from heavy water ?



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**15.** Give one example of a reaction in which dihydrogen acts as:  
an oxidising agent



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**16.** Give one example of a reaction in which dihydrogen acts as:  
a reducing agent



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**17.** Explain the laboratory preparation of dihydrogen.



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**18.** At room temperature, Hydrogen reacts very Slowly. Explain (HOTS)



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**19.** Explain the consequences of high enthalpy of H-H bond in terms of chemical reactivity of dihydrogen.



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**20.** Calcium Hydroxide cannot be used to remove permanent hardness of water why?



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**21.** How will you classify water based on the spin of the nuclei of the hydrogen atoms ?



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**22.** Explain the reaction of water with metals of Group I.



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**23.** Explain the reaction of water with halogens.



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**24.** What is Heavy water ?



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**25.** What is Zeolite ?



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**26.** Water is an amphoteric oxide. Justify this statement.



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**27.** What causes hardness in water ?



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**28.** Ice floats on water. Give reason



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29. Why is water molecule polar?



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30. What are the types of hydrogen bonding?

Give example.



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**31.** Give any two methods of preparation of  $H_2O_2$ .



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**32.** Distinguish between  
hard water and soft water



**Watch Video Solution**

**33.** Distinguish between

Temporary hardness and permanent hardness.



**Watch Video Solution**

**34.** What is meant by binary hydride? Give example.



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**35.** What is hydrogen bonding?



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**36.** List out the various types of hydrides formed, when dihydrogen reacts with s-block, p-block, d-block and f-block elements.



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**37.** Statues coated with white lead turn black on exposure to air. Its original colour is restored on treatment with  $H_2O_2$ . Explain.



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**38.** What are ternary hydrides? Give example?



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**39.** Write short notes on Ionic Hydrides and give suitable examples.



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**40.** Explain covalent hydrides. How are they classified. Give examples.



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**41.** Write short notes on Metallic Hydrides.

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**42.** Identify the following as covalent, ionic or interstitial hydrides

*CaH<sub>2</sub>, LaH<sub>2</sub>, TiH<sub>2</sub>, NaH, GeH<sub>2</sub>, NH<sub>3</sub>*

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**43.** How do metallic hydrides differ from molecular hydrides?

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**44.** What do you mean by hydride gap ?



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**45.** Write down the possible applications of  $H_2O_2$  on the basis of its oxidising property.



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**46.** What is the nuclear reaction that take place in the sun and other stars?



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**47.** Why hydrogen gas is used as fuel?



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**48.**  $H_2O_2$  is always stored in plastic bottles ?

Why ?





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49. Why  $H_2O_2$  is used as mild antiseptic?



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50. Why metallic hydrides are called interstitial hydrides? Give one example.



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51. Write a note about gas hydrates.



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52. Give the advantage of future fuel-hydrogen.



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53. How does  $H_2O_2$  behave as bleaching agent?



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**54.** Draw the structure of

Acetic acid



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**55.** Draw the structure of

Water



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**56.** What do you understand by the term 'non stoichiometric hydrides'? Do you expect this type of hydrides to be formed by alkali metals? Justify your answer,



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**57.** Explain the action of soap with hard water.



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**58.** Write a note about saline (or) ionic hydride.



**Watch Video Solution**

**59.** What are intra molecular hydrogen bonding? Explain with an example.



**Watch Video Solution**

**60.** What are Clathrate hydrate? Explain it with suitable example.



**Watch Video Solution**

**61.** What are intermolecular hydrogen bonds? Explain with example.



**Watch Video Solution**

**62.** What is the difference between the terms 'hydrolysis' and 'hydration'?



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**63.** Why hydrogen behaves both as a halogen and as an alkali metal?



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**64.** Conc.  $H_2SO_4$  cannot be used for drying hydrogen gas. Why?



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**65.** Write a note on application of hydrogen in cutting and welding purpose.



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**66.** Why does hydrogen occur in a diatomic form rather than in a monoatomic form under normal conditions?



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**67.** Describe the industrial applications of hydrogen dependent on : a. the heat liberated when its atoms are made to combine on the surface of a metal.

b. its effect on unsaturated organic system in

presence of a catalyst.

c. its ability to combine with nitrogen under specific conditions.



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**68.** Illustrate the industrial applications of hydrogen , depending on

Its ability to combine with nitrogen under specific conditions.



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**69.** Illustrate the industrial applications of hydrogen , depending on

Its ability to combine with nitrogen under specific conditions.



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**70.** List out the uses of hydrogen.



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71. Explain the exchange reactions of deuterium



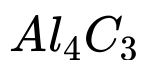
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72. Bond angle of water is reduced from  $109.28^\circ$  to  $104.5^\circ$ . Explain.



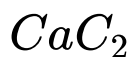
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73. How does heavy water react with the following compounds?



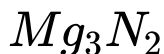
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74. How does heavy water react with the following compounds?



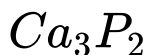
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75. How does heavy water react with the following compounds?



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76. How does heavy water react with the following compounds?



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77. Compare the structures of ice & water.



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78. Can marine species live in distilled water?



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79. Can distilled water be called as deionised water?



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**80.** Mention any two biological effects of  $D_2O$



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**81.** Name the salts that lead to the formation of permanent hardness in water can you remove permanent hardness by boiling?



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**82.** How will you regenerate zeolite in ion-exchange method?



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**83.** What kind of compounds can be dissolved and hydrolysed in water?



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**84.** Water is a useful solvent. Which properties make water as a good solvent?



**View Text Solution**

**85.** List out the properties that allow water to play a key role in the biosphere



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**86.** How does the hard water affect the boilers?



**View Text Solution**

**87.** Soap forms lather with soft water but does not form lather with hard water. Why?



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**88.** Why hard water is not suitable for laundry?



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**89.** Identify the nature of hydrides that are formed by the elements of atomic numbers 15, 19, 23, 44 with dihydrogen. Compare their reactivity towards water.



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**90.** How are reducing agents in synthetic organic chemistry prepared?





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91. What are the advantages of using hydrogen as fuel?



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92. Explain about Hydrogen sponge.



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**93.** How is hydrogen peroxide prepared on industrial scale?



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**94.** How is hydrogen peroxide is used to restore the white colour of old paintings.



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**95.** How is tritium prepared?



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96. Difference between ortho and para hydrogen.



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## Numerical Problem

1. An element (A) belonging to group number 1 and period number 3 react with dihydrogen to

form an hydride (B). The element (A) reacts with the universal solvent to give a strong base (C). Identify A, Band C.



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2. Identify the compound (A) which is a universal solvent. Compound A reacts with chlorine gas to give B and C. Compound A dissolves in an ionic compound of silicon to give compound D. Identify A and write the



equations involved in the formation of B, C and D.



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