



# CHEMISTRY

## NCERT - NCERT CHEMISTRY(TELUGU)

### HYDROGEN

#### Problem Type

1. Comment on the reactions of dihydrogen with (i) chloride (ii) sodium, and (iii) copper (II) oxide.



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2. Would you expect the hydrides of N, O and F to have lower boiling points than the hydrides of their subsequent group members? Give reasons.



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3. Can phosphorus without electronic configuration  $3s^2 3p^3$  form  $PH_5$ ?



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4. How many water molecules present in  $CuSO_4 \cdot 5H_2O$  are hydrogen bonded?



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



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## Exercise

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



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2. Name the isotopes of hydrogen. What is the ratio of the masses of these isotopes?



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



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4. How can the production of dihydrogen, obtained from coal gasification, be increased?



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5. Describe the bulk preparation of dihydrogen by electrolytic method. What is the role of an electrolyte in this process?



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6. Complete and balance the following reactions :



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7. Discuss the consequences of high enthalpy of H-H bond in terms of chemical reactivity of dihydrogen.



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



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9. What characteristics do you expect from an electron deficient hydrocarbon with respect to its structure and chemical reactions?



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10. Do you expect the carbon hydrides of the type ( $C_nH_{2n+2}$ ) to act as Lewis acid or base? Justify your answer.



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**11.** 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 answer.



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



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**13.** How does the atomic hydrogen or oxy-hydrogen torch function for cutting and welding purposes? Explain



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



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**15.** Saline hydrides are known to react with water violently producing fire. Can  $CO_2$ , a well known fire extinguisher, be used in this case? Explain.



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**16.** Arrange the following

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

(ii) LiH, NaH and CsH in order of increasing

ionic character.

(ii) H-H, D-D and F-F in order of increasing bond dissociation enthalpy.

(iv)  $NaH$ ,  $MgH_2$  and  $H_2O$  in order of increasing reducing property.



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



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**18.** What do you understand by the term auto-protolysis of water? What is its significance?



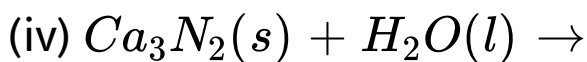
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**19.** Consider the reaction of water with  $F_2$  and suggest, in terms of oxidation and reduction, which species are oxidised/reduced.



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20. Complete and balance the following chemical reactions:



Classify the above into (a) hydrolysis (b) redox and (c) hydration reactions.



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21. Describe the structure of the common form of ice.



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



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**23.** Discuss the principle and the method of softening of hard water by synthetic, ionexchange resins.



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**24.** Write chemical reactions, to show the amphoteric nature of water.



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



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



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



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**28.** Describe the usefulness of water in biosphere and biological systems.



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**29.** What properties of water make it useful as a solvent? What types of compound can it (1) dissolve, and (II) hydrolyse?



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**30.** Knowing the properties of  $H_2O$  and  $D_2O$  do you think that  $D_2O$  can be used for drinking purposes?



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



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**32.** How can saline hydrides remove traces of water from organic compounds?



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**33.** What do you expect the nature of hydrides is if formed by elements of atomic numbers 15, 19, 23 and 44 with dihydrogen? Compare their behaviour towards water.



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34. Do you expect different products in solution when aluminium (III) chloride and potassium chloride treated separately with (i) normal water (ii) acidified water, and (iii) alkaline water? Write equations wherever necessary.



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



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**36.** What do you understand by the terms:

(i) hydrogen economy (ii) hydrogenation (iii) syngas (iv) water gas shift reaction (v) fuel - cell?



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