



CHEMISTRY

NCERT - NCERT CHEMISTRY(ENGLISH)

HYDROGEN

Solved Example

1. Comment on the reactions of dihydrogen with (a) chlorine, (b) sodium and (c) copper (II) oxide.



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

Give reason.

b. Can phosphorous with outer electronic configuration $3s^2 3p^3$ form PH_5 ?

c. How many hydrogen-bonded water molecules(s) are associated with

$CuSO_4 \cdot 5H_2O$?



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



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5. There is a sample of 10 volume of hydrogen peroxide solution . Calculate its strength.



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



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



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3. Why does hydrogen occur in a 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?



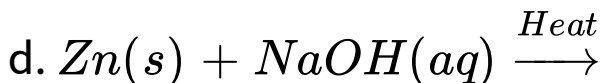
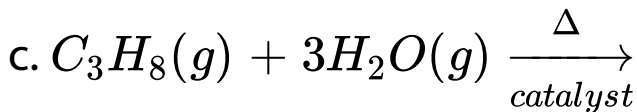
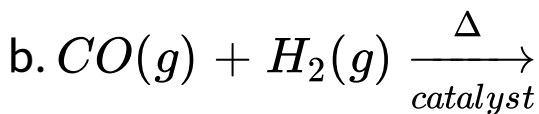
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5. Describe the bulk preparation of dihydrogen by electrolytic method. What is the role of an electrolyte in this process?



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6. Complete 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 hydride 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 your 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.

(iii) 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?



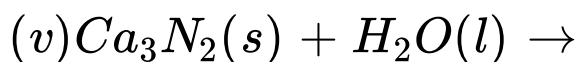
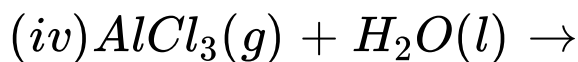
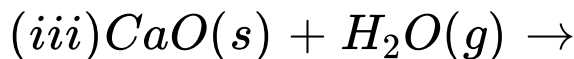
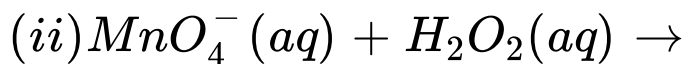
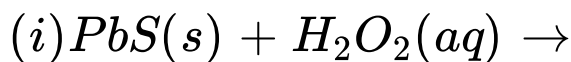
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19. Consider the reaction of water with F_2 and suggest, in terms of oxidation and reduction, which species are oxidised/reduced.



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20. Complete 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 method of softening of hard water by synthetic ion-exchange 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 it can be obtained?



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27. Is demineralised or distilled water useful for drinking purpose? 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 (i) 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 purpose?



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31. What is the difference between 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, it 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 (a) normal water, (b) acidified water and (c)

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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