



CHEMISTRY

BOOKS - MAXIMUM PUBLICATION

Hydrogen

Exercise

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



D. CaH_2

Answer: D

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2. The radio active isotope of hydrogen is _____

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3. Temporary hardness of water is due to the presence of

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4. D_2O is used as _____ in nuclear reactors.

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5. 30 volumes of H_2O_2 means

- A. 30% H_2O_2 solution
- B. 30cm^3 of the solution contains 1g of H_2O_2
- C. 1cm^3 of the solution liberates 30cm^3 of O_2 at STP
- D. 30cm^3 of the solution contains 1 Mole of H_2O_2

Answer: C



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6. Name the three isotopes of hydrogen.



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7. Dihydrogen is prepared on industrial scale from syn gas by

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8. Among the following elements which does not make a hydride is

A. Ti

B. Mg

C. Co

D. Pd

Answer: C

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9. Hydrogen is purified by_____

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10. H_2O_2 is _____

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11. Ortho & para hydrogen are_____

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12. Write one method each for the laboratory preparation of dihydrogen from i) mineral acid ii) aqueous alkali. Which is the catalyst used for the reaction?

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13. Write one method each for the laboratory preparation of dihydrogen from i) mineral acid ii) aqueous alkali. Which is the product in this reaction?

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14. Classify the following into those causing temporary hardness :

$[Mg(HCO_3)_2, Ca(HCO_3)_2, CaSO_4]$

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15. Classify the following into those causing permanent hardness:

$[CaSO_4, MgCl_2, NaHCO_3]$

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16. The bond angle in water is different from the tetrahedral bond angle . Justify

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17. What is the bond angle and shape of water?

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18. Among NH_3 , H_2O and HF which would you expect to have highest magnitude of hydrogen bonding? Why?

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19. Soap does not give lather with hard water. Why?

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20. What are the disadvantages of hard water?

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21. Write one example each for the oxidising action of H_2O_2 in acidic medium and basic medium.

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22. Write one example each for the reducing action of H_2O_2 in acidic medium and basic medium.



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23. Write two examples for redox reactions involving water.

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24. Distinguish between: Hard and Heavy water

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25. Distinguish between : Temporary and permanent hardness of water.

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26. Hydrogen combines with elements to give binary compounds known as hydrides.: Name the three categories of hydrides.

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27. Hydrogen combines with elements to give binary compounds known as hydrides.: Classify the given hydrides into different categories: [NH_3 , LiH , TiH , CH_4 , NaH]

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28. Prepare a short note on different types of hydrides

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29. Analyse the equation: $2Na + H_2 \rightarrow 2NaH$ In this chemical equation, H_2 reacts with

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30. Analyse the equation: $2Na + H_2 \rightarrow 2NaH$ Hydrogen reacts with metals to form...

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31. Analyse the equation: $2Na + H_2 \rightarrow 2NaH$ Hydrogen is in..... oxidation state in NaH

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32. How is hydrogen of high purity prepared?

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33. Dihydrogen is relatively inert at room temperature . Give reason.

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34. Write any two uses of hydrogen.

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35. A sample of cold river water does not easily give lather with soap, but on boiling it does. Evaluate and write the chemical

equation involved

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36. A sample of cold river water does not easily give lather with soap, but on boiling it does. In some cases the water does not give ready lather even if it is boiled. Why?

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37. Hydrogen has three isotopes - Protium, Deuterium and Tritium : Of these which is the radio active one?

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38. Hydrogen has three isotopes - Protium. Deuterium and Tritium : Name a compound which contains the isotope deuterium.

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39. Hydrogen has three isotopes - Protium. Deuterium and Tritium : Make a table which shows number of protons, neutrons and electrons in each isotope.

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40. What are the three types of hydrides? Give examples for each.

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41. What is meant by amphoteric nature of water?

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42. What are the advantages of dihydrogen as a fuel?

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43. What are the disadvantages of using dihydrogen as a fuel?

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44. What is meant by the term 'hydrogen economy'?

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45. Write a method for the preparation of H_2O_2

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46. What is 100 volume H_2O_2

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47. Draw the structure of H_2O_2 in gas phase.

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48. Ion exchange process is commonly employed for large scale production of soft water. What is the basic principle involved in ion exchange method of softening water?

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49. Ion exchange process is commonly employed for large scale production of soft water. What are inorganic cation exchangers?

Give example

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50. What is heavy water? Mention one use of heavy water.

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51. Explain why hydrogen peroxide is not stored in glass vessels.

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52. What is calgon? What is its use?

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53. Name the oxide of isotope of hydrogen used in nuclear reactor

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54. What are cation exchange resins? What is their role in removing permanent hardness of water?

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55. What is permittit? How is it useful in removing permanent hardness of water?

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56. Compare the structures of water and hydrogen peroxide.

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57. Give the industrial method of preparation of H_2O_2

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58. How is heavy water prepared?

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59. How is pure de-mineralised water obtained?

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60. Explain why hydrogen peroxide is stored in coloured plastic bottles.

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61. Write any two uses of H_2O_2

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62. A sample of hardwater was found to lose its hardness on boiling. Name the type of hardness associated with this sample.

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63. Write the name and formula of four minerals which cause permanent hardness of water.

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64. What are electron deficient hydrides? Whether they behave as Lewis acids or Lewis bases? Why?

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65. Certain samples of water do no produce easy lather with soap. What is this condition of water called?

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66. Certain samples of water do no produce easy lather with soap. Which are two types of of this condition?

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67. Certain samples of water do no produce easy lather with soap. Suggest two methods to change this condition of water

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68. Certain samples of water do not produce easy lather with soap. What are the problems caused by this condition of water?

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69. A list of compounds are given below: (H_2O , HCl , CH_4)
Construct chemical reactions to show the preparation of H_2 ,
from each of the above compounds.

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70. What is syn gas? How is it prepared?

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71. What is coal gasification?



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72. Explain water gas shift reaction.



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



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



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

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76. What causes the temporary and permanent hardness of water?

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77. Write chemical reactions to show amphoteric nature of water.

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

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79. How does H_2O_2 , behave as a bleaching agent?

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80. What is heavy water? Mention one use of heavy water.

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81. Explain why hydrogen peroxide is not stored in glass vessels.

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82. What is calgon? What is its use?

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83. The efficiency of a boiler is found to decrease when boiler scales are formed. Write the chemistry of scale formation?

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84. The efficiency of a boiler is found to decrease when boiler scales are formed. Suggest a suitable chemical method to prevent the scale formation.

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85. Account for the following observations: i) The density of ice is lower than that of water. ii) Hard water doesn't give ready lather with soap.

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86. Justify the position of hydrogen in the periodic table

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87. Vegetable oil is converted into vanaspati fat by process.

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88. D_2O is generally called.....

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89. Hydrogen peroxide is an important chemical used in pollution control treatment of domestic and industrial effluents. Write the molecular formula of hydrogen peroxide.

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90. Explain with suitable chemical equation, why hydrogen peroxide is stored in waxlined glass or plastic vessels in dark.

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91. Draw the structure of hydrogen peroxide

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92. Permanent hardness of water can be removed only by chemical methods. Write the name of any one salt responsible for the permanent hardness of water.

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93. Permanent hardness of water can be removed only by chemical methods. Sodium hexametaphosphate is commercially called.....

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94. How is sodium hexametaphosphate useful in removing the permanent hardness of water?

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95. Suggest a disadvantage of hard water.

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96. Hard water contains calcium and magnesium salts. Therefore it does not lather with soap. Hard water is harmful for boilers. Why?

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97. How will you remove the hardness from the water by using washing soda?



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98. Which method is more suitable to get pure demineralised water?



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99. Hydrogen peroxide is stored in plastic vessels in dark why?



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100. About 18% of the total production of dihydrogen is from coal. What is 'coal gasification'?

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101. About 18% of the total production of dihydrogen is from coal. How is dihydrogen produced by a 'water-gas shift reaction'?

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102. Write any two uses of dihydrogen.

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103. Water is an amphoteric substance. Justify

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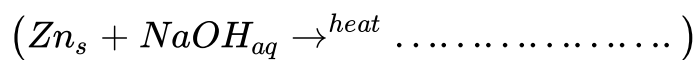
104. Hydrides are binary compounds of hydrogen with other elements. Give one example each for electron deficient and electron rich hydride.

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105. H_2O_2 is a bleaching agent. Why?

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106. Complete the following reaction.



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107. In a seminar, if you are asked to present a paper on hydrogen economy, write any two points you are going to include in your paper.

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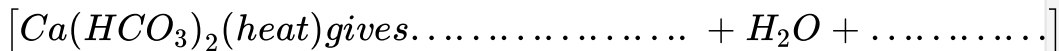
108. Give one reaction supporting the amphoteric nature of water.

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109. Write the names of any two electron - rich hydrides.

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110. Complete the following reaction:



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111. Syn gas' is a mixture of

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112. A sample of river water does not give lather with soap easily when it is cold, but on heating gives ready lather with soap. Why?

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113. Draw the structure of a hydrogen peroxide molecule.



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114. Hydrogen reacts with most of the metals and non metals to form hydrides. Elements in which one of the following group/groups of the periodic table do not form hydrides?

A. Group 15, 16, 17

B. Group 13

C. Groups 7, 8, 9

D. Group 14

Answer: C

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115. Explain the different types of covalent hydrides with suitable examples.

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116. Hydrogen peroxide restore the colour of lead paintings. Give a reason.

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117. Discuss the position of hydrogen in the periodic table.

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118. Account for the following: H_2O_2 is a bleaching agent.



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119. Density of ice is lower than that of water.

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120. Hydrogen is the most abundant element in the universe. But in free state it is almost not found in earth's atmosphere. Suggest any three method for the preparation of H_2 , gas.

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121. Do you expect carbonylides of the type $[C_nH_{2n+2}]$ to act as Lewis acid or base? Why?

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