

PREVIOUS HSE QUESTIONS FROM THE CHAPTER "HYDROGEN"

1. Hydrogen reacts with most of the metals and nonmetals to form hydrides.
 - a) Elements in which one of the following group/groups of the periodic table do not form hydrides?
 - i) Groups 15, 16, 17 ii) Group 18 iii) Groups 7, 8, 9 iv) Group 14 (1)
 - b) Explain the different types of covalent hydrides with suitable examples. (3) [October 2015]
2. a) 'Syn gas' is a mixture of
 - i) CO and H₂O ii) CO and H₂ c) CO₂ and H₂ iv) CH₄ and CO (1)
 - b) i) 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? (2)
 - ii) Draw the structure of a hydrogen peroxide molecule. (1) [March 2015]
3. a) Give one reaction supporting the amphoteric nature of water. (2)
- b) Write the names of any two electron-rich hydrides. (1)
- c) Complete the following reaction
$$\text{Ca}(\text{HCO}_3)_2 \xrightarrow{\text{heating}} \dots\dots\dots + \text{H}_2\text{O} + \dots\dots\dots$$
 (1) [August 2014]
4. a) H₂O₂ is a bleaching agent. Why? (1)
- b) Complete the following reaction.
$$\text{Zn(s)} + \text{NaOH(aq)} \xrightarrow{\text{heat}} \dots\dots\dots$$
 (1)
- c) 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. (2) [March 2014]
5. a) Water is an amphoteric substance. Justify. (2)
- b) Hydrides are binary compounds of hydrogen with other elements. Give one example each for electron deficient and electron rich hydrides. (2) [September 2013]
6. About 18% of the total production of dihydrogen is from coal.
 - a) What is 'coal gasification'? (1)
 - b) How is dihydrogen produced by 'water gas shift reaction'? (2)
 - c) Write any two uses of dihydrogen. (1) [March 2013]
7. a) Hard water contains calcium and magnesium salts. Therefore it does not lather with soap.
 - i) Hard water is harmful for boilers. Why? (1)
 - ii) How will you remove the hardness from water by using washing soda? (1)
 - iii) Which method is more suitable to get pure demineralised water? (1)
 - b) Hydrogen peroxide is stored in plastic vessels in dark. Why? (1) [September 2012]
8. Permanent hardness of water can be removed only by chemical methods.
 - a) Write the name of any one salt responsible for the permanent hardness of water. (1)
 - b) Sodium hexametaphosphate is commercially called (1)
 - c) How is sodium hexametaphosphate useful in removing the permanent hardness of water? (1)
 - d) Suggest a disadvantage of hard water. (1) [March 2012]
9. a) Vegetable oil is converted into vanaspathi fat by process. (½)
- b) D₂O is generally called (½)
- c) Hydrogen peroxide is an important chemical used in pollution control treatment of domestic and industrial effluents.
 - i) Write the formula of hydrogen peroxide. (½)
 - ii) Draw the structure of hydrogen peroxide (1)
 - iv) Explain with suitable chemical equation, why hydrogen peroxide is stored in wax-lined glass or plastic vessel in dark. (1½) [October 2011]
10. a) Account for the following observations:
 - i) The density of ice is lower than that of water. (1)

- ii) Hard water does not give ready lather with soap. (1)
- b) Justify the position of hydrogen in the periodic table. (2) [March 2011]
11. The efficiency of a boiler is found to decrease when boiler scales are formed.
- a) Which are the possible compounds present in water for scale formation? (1)
- b) Write the chemistry of scale formation. (1)
- c) Suggest a suitable chemical method to prevent the scale formation. (2) [September 2010]
12. Match the following by selecting the items from columns B and C which are most suitable to those in column A.

A	B	C
a) Protium, Tritium	1) Hard water	i) Fertilizer
b) Ca^{2+} , Mg^{2+}	2) Heavy water	ii) Hydrogen
c) H_2O_2	3) Isotopes	iii) Moderator in nuclear reactor
d) D_2O	4) Perhydrol	iv) No lather with soap
	5) Phenol	v) Antiseptic

(4) [March 2010]

11. a) What is heavy water? Mention one of its uses? (2)
- b) Explain why hydrogen peroxide is not stored in glass vessels. (1)
- c) What is calgon? What is its use? (1) [March 2009]
12. a) Name the isotopes of hydrogen. (1)
- b) What is heavy water? (1)
- c) What is a moderator? (1) [June 2008]
13. Hard water does not give ready lather with soap.
- a) What is the reason for hardness? (1)
- b) What are the two types of hardness? (1)
- c) Suggest one method to remove hardness. (1) [February 2008]

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