

10. Hydrogen – Multiple Choice Questions

1. Hydrogen

- Ortho and para hydrogen differ in
 - Proton spin
 - Electron spin
 - Nuclear charge
 - Nuclear reaction
- Which of the following explanation is best for not placing hydrogen with alkali metals or halogen
 - The ionization energy of hydrogen is high for group of alkali metals or halogen
 - Hydrogen can form compounds
 - Hydrogen is much lighter element than the alkali metals or halogens
 - Hydrogen atom does not contain any neutron
- Hydrogen resembles halogens in many respects for which several factors are responsible. Of the following factors which one is most important in this respect
 - Its tendency to lose an electron to form a cation
 - Its tendency to gain a single electron in its valence shell to attain stable electronic configuration
 - Its low negative electron enthalpy value
 - Its small size
- Why does H^+ ion always get associated with other atoms or molecules
 - Ionisation enthalpy of hydrogen resembles that of alkali metals
 - Its reactivity is similar to halogens
 - It resemble both alkali metals and halogens
 - Loss of an electron from hydrogen atom results in a nucleus of very small size as compared to other atoms or ions. Due to small size it cannot exist free.
- Which of the following hydrides is electron-precise hydride
 - B_2H_6
 - NH_3
 - H_2O
 - CH_4
- Ordinary hydrogen at room temperature is a mixture of
 - 75% of o-hydrogen + 25% of p-hydrogen
 - 25% of o-hydrogen + 75% of p-hydrogen
 - 50% of o-hydrogen + 50% of p-hydrogen
 - 1% of o-hydrogen + 99% of p-hydrogen
- Which statement is not correct for ortho and para hydrogen
 - They have different boiling points
 - Ortho-forms is more stable than para-form
 - They differ in their nuclear spin
 - The ratio of ortho to para hydrogen changes with change in temperature
- Ortho-hydrogen and para-hydrogen resembles in which of the following property
 - Thermal conductivity
 - Magnetic properties
 - Chemical properties
 - Heat capacity
- Hydrogen has three isotopes, the number of possible diatomic molecules will be
 - 2
 - 6
 - 9
 - 12
- Triatomic hydrogen is called
 - Deuterium
 - Hyzone
 - Ortho form
 - Hydronium ion
- Hydrogen can behave as a metal
 - At very high temperature
 - At very low temperature
 - At very high pressure
 - At very low pressure
- Hydrogen burns in air with a
 - Light bluish flame
 - Yellow flame
 - Green flame
 - None of these
- Hydrogen can be fused to form helium at
 - High temperature and high pressure
 - High temperature and low pressure
 - Low temperature and high pressure
 - Low temperature and low pressure
- Hydrogen can be prepared by mixing steam, and water gas at 500°C in the presence of Fe_3O_4 and Cr_2O_3 . This process is called
 - Nelson process
 - Serpeck's process
 - Bosch process
 - Parke's process
- Which of the following metal do not liberate hydrogen from dilute hydrochloric acid
 - Zn
 - Mg
 - Fe
 - Au

16. When electric current is passed through an ionic hydride in the molten state
- Hydrogen is liberated at the anode
 - Hydrogen is liberated at the cathode
 - No reaction takes place
 - Hydride ion migrates towards cathode
17. Which of the following gas is insoluble in water
- SO_2
 - NH_3
 - H_2
 - CO_2
18. Which of the following is correct for hydrogen
- It can form bonds in +1 as well as -1 oxidation state
 - It is always collected at cathode
 - It has a very high ionization potential
 - It has same electronegativity as halogens
19. Metal which does not react with cold water but evolves H_2 with steam is
- Na
 - K
 - Pt
 - Fe
20. $\text{TiH}_{1.73}$ is an example of
- Ionic hydride
 - Covalent hydride
 - Metallic hydride
 - Polymeric hydride
21. Metal hydrides are ionic, covalent or molecular in nature. Among LiH , NaH , KH , RbH , CsH , the correct order of increasing ionic character is
- $\text{LiH} > \text{NaH} > \text{CsH} > \text{KH} > \text{RbH}$
 - $\text{LiH} < \text{NaH} < \text{KH} < \text{RbH} < \text{CsH}$
 - $\text{RbH} > \text{CsH} > \text{NaH} > \text{KH} > \text{LiH}$
 - $\text{NaH} > \text{CsH} > \text{RbH} > \text{LiH} > \text{KH}$
22. Which of the following reactions is an example of use of water gas in the synthesis of other compounds
- $\text{CH}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \xrightarrow[\text{Ni}]{1270\text{ K}} \text{CO}(\text{g}) + \text{H}_2(\text{g})$
 - $\text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g}) \xrightarrow[\text{Catalyst}]{673\text{ K}} \text{CO}_2(\text{g}) + \text{H}_2(\text{g})$
 - $\text{C}_n\text{H}_{2n+2} + n\text{H}_2\text{O}(\text{g}) \xrightarrow[\text{Ni}]{1270\text{ K}} n\text{CO} + (2n+1)\text{H}_2$
 - $\text{CO}(\text{g}) + 2\text{H}_2(\text{g}) \xrightarrow[\text{Catalyst}]{\text{Cobalt}} \text{CH}_3\text{OH}(\text{l})$
23. Deuterium resembles hydrogen in chemical properties but reacts
- More vigorously than hydrogen
 - Faster than hydrogen
 - Slower than hydrogen
 - Just as hydrogen
24. Which of the following produces hydrolith with dihydrogen
- Mg
 - Al
 - Cu
 - Ca
25. Which is poorest reducing agent
- Nascent hydrogen
 - Atomic hydrogen
 - Dihydrogen
 - All have same reducing strength
26. An ionic compound is dissolved simultaneously in heavy water and simple water. Its solubility is
- Larger in heavy water
 - Smaller in heavy water
 - Solubility is same in both
 - Smaller in simple water
27. Protonic acid is
- A compound that form solvated hydrogen ion in polar solvent
 - An acid which accepts the proton
 - A compound that forms hydride ion in polar solvent
 - An acid which donates the proton
28. Pure hydrogen is obtained by carrying electrolysis of
- Water containing H_2SO_4
 - Water containing NaOH
 - $\text{Ba}(\text{OH})_2$ solution
 - KOH solution
29. LiAlH_4 is obtained by reacting an excess of with an ethereal solution of AlCl_3
- LiCl
 - LiH
 - Li
 - LiOH
30. Group 2 hydrides with significant covalent character is/are
- BeH_2
 - MgH_2
 - Both (a) and (b)
 - None of these
31. Syngas is a mixture of
- $\text{CO}_2 + \text{H}_2$
 - $\text{CO} + \text{H}_2$
 - $\text{CO} + \text{CO}_2$
 - $\text{CO} + \text{N}_2$
 - $\text{CO} + \text{O}_2$
32. Which of the following reactions increases production of dihydrogen from synthesis gas
- $\text{CH}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \xrightarrow[\text{Ni}]{1270\text{ K}} \text{CO}(\text{g}) + 3\text{H}_2(\text{g})$
 - $\text{C}(\text{s}) + \text{H}_2\text{O}(\text{g}) \xrightarrow{1270\text{ K}} \text{CO}(\text{g}) + \text{H}_2(\text{g})$
 - $\text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g}) \xrightarrow[\text{Catalyst}]{673\text{ K}} \text{CO}_2(\text{g}) + \text{H}_2(\text{g})$
 - $\text{C}_2\text{H}_6 + 2\text{H}_2\text{O} \xrightarrow[\text{Ni}]{1270\text{ K}} 2\text{CO} + 5\text{H}_2$

33. Elements of which of the following group (s) of periodic table do not form hydrides

- (a) Groups 7, 8, 9 (b) Group 13
(c) Groups 15, 16, 17 (d) Group 14

34. Only one element of forms hydride

- (a) Group 6 (b) Group 7
(c) Group 8 (d) Group 9

2. Water or Hydride of Oxygen

1. Heavy water (D_2O) is

- (a) A product of oxygen and isotope of hydrogen
(b) Water of mineral springs
(c) Heavier isotope of hydrogen and heavier isotope of oxygen
(d) Ordinary water containing dissolved salts of heavy metals

2. Temporary hardness of water can be removed by

- (a) Addition of potassium permanganate
(b) Boiling
(c) Filtration
(d) Addition of chlorine

3. H_2O is hard if it contains

- (a) $NaHCO_3$ (b) $MgSO_4$
(c) KCl (d) $NaCl$

4. The low density of ice compared to water is due to

- (a) Induced dipole-induced dipole interactions
(b) Dipole-induced dipole interaction
(c) Hydrogen bonding interactions
(d) Dipole-dipole interactions

5. Which of the following is a use of alum

- (a) Making explosives (b) Bleaching clothes
(c) Water softening (d) All of the above

6. The alum used for purifying water is

- (a) Ferric alum (b) Chrome alum
(c) Potash alum (d) Ammonium alum

7. Match **list I** with **list II** and select the correct answer using the codes given below the lists

	List I		List II
1.	Heavy water	(a)	Bicarbonates of Mg and Ca in water
2.	Temporary hard water	(b)	No foreign ions in water
3.	Soft water	(c)	D_2O

4.	Permanent hard water	(d)	Sulphates and chlorides of Mg and Ca in water
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Codes

- (a) 1-c, 2-d, 3-b, 4-a (b) 1-b, 2-a, 3-c, 4-d
(c) 1-b, 2-d, 3-c, 4-a (d) 1-c, 2-a, 3-b, 4-d

8. Maximum number of hydrogen bonding in H_2O is

- (a) 1 (b) 2
(c) 3 (d) 4

9. Why do calcium ions make water hard but sodium ions do not

- (a) Calcium forms insoluble compounds with stearate ions present in soap
(b) Sodium forms insoluble compounds with stearate ions present in soap
(c) Calcium forms soluble compounds with stearate ions present in soap
(d) Both calcium and sodium forms insoluble compounds with stearate ions present in soap

10. D_2O is preferred to H_2O , as a moderator, in nuclear reactors because

- (a) D_2O slows down fast neutrons better
(b) D_2O has high specific heat
(c) D_2O is cheaper
(d) None of these

11. Which of the following ions will cause hardness in water sample

- (a) Ca^{2+} (b) Na^+
(c) Cl^- (d) K^+

12. Systematic name of H_2O (oxide of hydrogen) is

- (a) Water (b) Hydrogen oxide
(c) Oxidane (d) None of these

13. Synthetic detergents are more effective in hard water than soaps because

- (a) They are highly soluble in water
(b) Their Ca^{++} and Mg^{++} salts are water soluble
(c) Their Ca^{++} and Mg^{++} salts are insoluble in water
(d) None of these

14. Water softening by Clark's process uses

- (a) $CaCO_3$ (b) $Ca(OH)_2$
(c) $CaSO_4$ (d) HCl

15. Which of the following will determine whether the given colourless liquid is water or not
- Melting
 - Tasting
 - Phosphphthalein
 - Adding a pinch of anhydrous CuSO_4
16. Lead pipes are not used for carrying drinking water because
- They are covered with a coating of lead carbonate
 - They are corroded by air and moisture
 - Water containing dissolved air attacks lead, forming soluble hydroxide
 - None of these
17. Permanent hardness of water is due to the presence of
- Bicarbonates of sodium and potassium
 - Chlorides and sulphates of sodium and potassium
 - Chlorides and sulphates of calcium and magnesium
 - Bicarbonates of calcium and magnesium
 - Phosphates of sodium and potassium
18. Which of the following will cause softening of hard water
- Passing it through cation exchange resin
 - Passing it through anion exchange resin
 - Passing it through sand
 - Passing it through alumina
19. By which of the following process permanent hardness of water can be removed, by adding
- Sodalime
 - Sodiumbicarbonate
 - Washing soda
 - Sodium chloride
20. Permutit is technical name given to
- Aluminates of calcium and sodium
 - Silicates of calcium and sodium
 - Hydrated silicates of aluminium and sodium
 - Silicates of calcium and magnesium
21. Sodium sulphate is soluble in water but barium sulphate is insoluble because
- The hydration energy of Na_2SO_4 is more than its lattice energy
 - The lattice energy of BaSO_4 is more than its hydration energy
 - The lattice energy has no role to play in solubility
 - The hydration energy of Na_2SO_4 is less than its lattice energy
 - Both (a) and (b)
22. Which of the following metal will not reduce H_2O
- Ca
 - Fe
 - Cu
 - Li
23. When two ice cubes are pressed over each other, they unite to form one cube. Which of the following forces is responsible to hold them together
- Hydrogen bond formation
 - Vander Waals forces
 - Covalent attraction
 - Ionic interaction
24. What is formed when calcium carbide reacts with heavy water
- C_2D_2
 - CaD_2
 - $\text{Ca}_2\text{D}_2\text{O}$
 - CD_2
25. A sample of water containing some dissolved table sugar and common salt is passed through organic ion exchange resins. The resulting water will be
- Tasteless
 - Sweet
 - Salty
 - None of these
26. Which of the following can effectively remove all types of hardness of water
- Soap
 - Washing soda
 - Slaked lime
 - None of these
27. Hardness producing salt, whose solubility in water decreases with rise of temperature is
- CaCl_2
 - CaSO_4
 - $\text{Ca}(\text{HCO}_3)_2$
 - MgSO_4
28. Which of the following compounds is used for water softening
- $\text{Ca}_3(\text{PO}_4)_2$
 - Na_3PO_4
 - $\text{Na}_6\text{P}_6\text{O}_{18}$
 - Na_2HPO_4
29. Ozone is used for purifying water because
- It dissociates and release oxygen
 - Do not leave any foul smell like chlorine
 - Kills bacteria 'cyst' fungi and acts as a biocide
 - All of the above
30. The pH of D_2O and H_2O at 298 K is
- 7.0, 7.0
 - 7.35, 7.0
 - 7.0, 6.85
 - 6.85, 7.35
31. Which of the following is not true
- Ordinary water is electrolysed more rapidly than D_2O
 - Reaction between H_2 and Cl_2 is much faster than D_2 and Cl_2
 - D_2O freezes at lower temperature than H_2O
 - Bond dissociation energy for D_2 is greater than H_2

32. Saline hydrides react explosively with water, such fires can be extinguished by
- Water
 - Carbon dioxide
 - Sand
 - None of these
33. Plumbosolvency is a health hazard in the transportation of
- Hard water only
 - Soft water only
 - Both (a) and (b)
 - Water containing plum juice

3. Hydrogen Peroxide

- The reaction of $H_2S + H_2O_2 \rightarrow S + 2H_2O$ manifests
 - Acidic nature of H_2O_2
 - Alkaline nature of H_2O_2
 - Oxidising nature of H_2O_2
 - Reducing action of H_2O_2
- The volume of oxygen liberated from 15 mL of 20 volume H_2O_2 is
 - 250 mL
 - 300 mL
 - 150 mL
 - 200 mL
- Which is false about H_2O_2
 - Act as both oxidising and reducing agent
 - Two OH bonds lies in the same plane
 - Pale blue liquid
 - Can be oxidised by ozone
- Radioactive elements emit α , β and γ rays and are characterised by their half-lives. The radioactive isotope of hydrogen is
 - Protium
 - Deuterium
 - Tritium
 - Hydronium
- Consider the reactions
 - $H_2O_2 + 2HI \longrightarrow I_2 + 2H_2O$
 - $HOCl + H_2O_2 \longrightarrow H_3O^+Cl^- + O_2$

Which of the following statements is correct about H_2O_2 with reference to these reactions? Hydrogen peroxide is.....

 - An oxidising agent in both (i) and (ii)
 - An oxidising agent in (i) and reducing agent in (ii)
 - A reducing agent in (i) and oxidising agent in (ii)
 - A reducing agent in both (i) and (ii)
- The oxide that gives H_2O_2 on treatment with dilute H_2SO_4 is
 - PbO_2
 - $BaO_2 \cdot 8H_2O + O_2$
 - MnO_2
 - TiO_2
- Which of the following equations depict the oxidising nature of H_2O_2
 - $2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 8H_2O + 5O_2$
 - $2Fe^{3+} + 2H^+ + H_2O_2 \rightarrow 2Fe^{2+} + 2H_2O + O_2$
 - $2I^- + 2H^+ + H_2O_2 \rightarrow I_2 + 2H_2O$
 - $KIO_4 + H_2O_2 \rightarrow KIO_3 + H_2O + O_2$
- Which of the following equation depicts reducing nature of H_2O_2
 - $2[Fe(CN)_6]^{4-} + 2H^+ + H_2O_2 \rightarrow 2[Fe(CN)_6]^{3-} + 2H_2O$
 - $I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$
 - $Mn^{2+} + H_2O_2 \rightarrow Mn^{4+} + 2OH^-$
 - $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$
- Hydrogen peroxide is.....
 - An oxidising agent
 - A reducing agent
 - Both an oxidising and a reducing agent
 - Neither oxidising nor reducing agent
- When sodium peroxide is treated with dilute sulphuric acid, we get
 - Sodium sulphate and water
 - Sodium sulphate and oxygen
 - Sodium sulphate hydrogen and oxygen
 - Sodium sulphate and hydrogen peroxide
- Hydrogen peroxide is obtained by the electrolysis of.....
 - Water
 - Sulphuric acid
 - Hydrochloric acid
 - Fused sodium peroxide
- There is a sample of 10 volume of hydrogen peroxide solution. Calculate its strength
 - 3.00%
 - 4.045%
 - 2.509%
 - 3.035%
- Blackened oil painting can be restored into original form by the action of
 - Chlorine
 - BaO_2
 - H_2O_2
 - MnO_2
- What is the product of the reaction of H_2O_2 with Cl_2
 - $O_2 + HOCl$
 - $HCl + O_2$
 - $H_2O + HCl$
 - $HCl + H_2$

15. H_2O_2 will oxidise

- (a) $KMnO_4$ (b) PbS
(c) MnO_2 (d) H_2S

16. Fenton's reagent is

- (a) $FeSO_4 + H_2O_2$ (b) $Zn + HCl$
(c) $Sn + HCl$ (d) None of these

17. The strength in volumes of a solution containing 30.36 g/litre of H_2O_2 is

- (a) 10 volume (b) 20 volume
(c) 5 volume (d) None of these

18. The $H-O-O$ bond angle in H_2O_2 is

- (a) 107.28° (b) 109.28°
(c) 104.5° (d) 106°
(e) 97°

19. K_a of H_2O_2 is of the order of

- (a) 10^{-12} (b) 10^{-14}
(c) 10^{-16} (d) 10^{-10}

20. In O_2 and H_2O_2 , the $O-O$ bond lengths are 1.21 and 1.48 Å respectively. In ozone, the average $O-O$ bond length is

- (a) 1.28 Å (b) 1.18 Å
(c) 1.44 Å (d) 1.52 Å

21. The volume strength of perhydral is

- (a) 20 (b) 30
(c) 100 (d) 10

22. To an aqueous solution of $AgNO_3$ some $NaOH(aq)$ is added, till a brown ppt. is obtained. To this H_2O_2 is added dropwise. The ppt. turns black with the evolution of O_2 . The black ppt. is

- (a) Ag_2O (b) Ag_2O_2
(c) $AgOH$ (d) None of these

23. Atomic hydrogen reacts with oxygen to give

- (a) Almost pure water
(b) Almost pure hydrogen peroxide
(c) A mixture of water and hydrogen peroxide
(d) None of these

24. When 2-ethylantraquinol dissolved in a mixture of benzene and cyclohexane and it is oxidised, the product is

- (a) Ethanol (b) Hydrogen peroxide
(c) Anthracene (d) None of these

4. IIT-JEE/ AIEEE

1. Which of the following pair will not produce dihydrogen gas

- (a) $Cu + HCl(dil.)$ (b) $Fe + H_2SO_4$
(c) $Mg + steam$ (d) $Na + alcohol$

[1994]

2. Hydrogen will not reduce

[1984, 85]

- (a) Heated cupric oxide (b) Heated ferric oxide
(c) Heated stannic oxide (d) Heated aluminium oxide

3. Hydrogen is evolved by the action of cold dil. HNO_3 on

[1998]

- (a) Fe (b) Mn
(c) Cu (d) Al

4. Very pure hydrogen (99.9) can be made by which of the following processes

[2012]

- (a) Reaction of methane with steam
(b) Mixing natural hydrocarbons of high molecular weight
(c) Electrolysis of water
(d) Reaction of salts like hydrides with water

5. Which one of the following statements about water is FALSE

[2016]

- (a) Water can act both as an acid and as a base
(b) There is extensive intramolecular hydrogen bonding in the condensed phase
(c) Ice formed by heavy water sinks in normal water
(d) Water is oxidized to oxygen during photosynthesis

6. Polyphosphates are used as water softening agents because they

[2002]

- (a) Form soluble complexes with anionic species
(b) Precipitate anionic species
(c) Forms soluble complexes with cationic species
(d) Precipitate cationic species

7. The concentration of fluoride, lead, nitrate and iron in a water sample from an underground lake was found to be 1000 ppb, 40 ppb, 100 ppm and 0.2 ppm, respectively. This water is unsuitable for drinking due to high concentration of

[2016]

- (a) Lead (b) Nitrate
(c) Iron (d) Fluoride

8. One mole of calcium phosphide on reaction with excess water gives

[1999]

- (a) One mole of phosphene
(b) Two moles of phosphoric acid
(c) Two moles of phosphene
(d) One mole of phosphorus pentoxide

9. The recommended concentration of fluoride ion in drinking water is up to 1 ppm as fluoride ion is required to make teeth enamel harder by converting $[3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{Ca}(\text{OH})_2]$ to

[2018]

- (a) $[3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2]$ (b) $[3\{\text{Ca}(\text{OH})_2\} \cdot \text{CaF}_2]$
(c) $[\text{CaF}_2]$ (d) $[3(\text{CaF}_2) \cdot \text{Ca}(\text{OH})_2]$

10. From the following statements regarding H_2O_2 , choose the incorrect statement

[2015]

- (a) It can act only as an oxidizing agent
(b) It decomposed on exposure to light
(c) It has to be stored in plastic or wax lined glass bottles in dark
(d) It has to be kept away from dust

11. HCl is added to following oxides. Which one would give H_2O_2

[1980; 1998]

- (a) MnO_2 (b) PbO_2
(c) BaO_2 (d) None of these

12. Hydrogen peroxide in its reaction with KIO_4 and NH_2OH respectively, is acting as a

[2014]

- (a) Reducing agent, oxidising agent
(b) Reducing agent, reducing agent
(c) Oxidising agent, oxidising agent
(d) Oxidising agent, reducing agent

13. The amount of H_2O_2 present in 1 L of 1.5 NH_2O_2 solution is

[1991]

- (a) 2.5 g (b) 25.5 g
(c) 3.0 g (d) 8.0 g

5. NEET/ AIPMT/ CBSE-PMT

1. Which one of the following substances is used in the laboratory for a fast drying of neutral gases

[1992]

- (a) Phosphorus pentoxide
(b) Active charcoal
(c) Anhydrous calcium chloride
(d) Na_3PO_4

2. The hydride ion H^- is a stronger base than its hydroxide ion OH^- . Which of the following reactions will occur if sodium hydride (NaH) is dissolved in water

[1997]

- (a) $\text{H}^-(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^-(\text{aq})$
(b) $\text{H}^-(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{OH}^-(\text{aq}) + \text{H}_2(\text{g})$
(c) $\text{H}^-(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{No reaction}$
(d) None of these

3. Which of the following statements about hydrogen is incorrect

[2016]

- (a) Hydrogen has three isotopes of which tritium is the most common
(b) Hydrogen never acts as cation in ionic salts
(c) Hydronium ion, H_3O^+ exists freely in solution
(d) Dihydrogen does not act as a reducing agent

4. Pure water can be obtained from sea water by

[2001]

- (a) Centrifugation (b) Plasmolysis
(c) Reverse osmosis (d) Sedimentation

5. Some statements about heavy water are given below

1. Heavy water is used as a moderator in nuclear reactors
2. Heavy water is more associated than ordinary water
3. Heavy water is more effective solvent than ordinary water

Which of the above statements are correct

[2010]

- (a) 1 and 2 (b) 1, 2 and 3
(c) 2 and 3 (d) 1 and 3

6. The structure of H_2O_2 is

[1999;]

- (a) Open book like (b) Linear
(c) Closed book (d) Pyramidal

7. Hydrogen peroxide is reduced by

[2000]

- (a) Ozone
(b) Barium peroxide
(c) Acidic solution of KMnO_4
(d) Lead sulphide suspension

8. The volume strength of 1.5 N H_2O_2 solution is

[1997]

- (a) 8.4 litres (b) 4.2 litres
(c) 16.8 litres (d) 5.2 litres

9. In H_2O_2 molecule, the angle between the two O - H planes is

[2002]

- (a) 90° (b) 101°
(c) 103° (d) 105°

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6. AIIMS

1. Spin isomerism is shown by

[2008]

- (a) Dichloro benzene (b) Hydrogen
(c) Dibasic acid (d) n-butane

2. Which of the following statement is not correct regarding hydrogen atom [2000]

- (a) It resembles halogens in some properties
- (b) It resembles alkali metals in some properties
- (c) It can be placed in 17th group of periodic table
- (d) It cannot be placed in first group of periodic table

3. Which of the following reaction produces hydrogen

[2002]

- (a) $Mg + H_2O$
- (b) $BaO_2 + HCl$
- (c) $H_2S_4O_8 + H_2O$
- (d) $Na_2O_2 + 2HCl$

4. Hydrogen can be prepared by the action of dil. H_2SO_4 on

[2007]

- (a) Copper
- (b) Iron
- (c) Lead
- (d) Mercury

5. Chemical A is used for water softening to remove temporary hardness. A reacts with sodium carbonate to generate caustic soda. When CO_2 is bubbled through a solution of A, it turns cloudy. What is the chemical formula of A [1999]

- (a) $CaCO_3$
- (b) CaO
- (c) $Ca(OH)_2$
- (d) $Ca(HCO_3)_2$

6. Ordinary water is not used as a moderator in nuclear reactors because

- (a) It cannot slow down fast moving neutrons
- (b) It cannot remove the heat from the reactor core
- (c) It absorbs the fast moving neutrons
- (d) Of its corrosive action on the metallic parts of the nuclear reactor

7. Assertion and Reason

Read the assertion and reason carefully to mark the correct option out of the options given below :

- (a) If both assertion and reason are true and the reason is the correct explanation of the assertion.
- (b) If both assertion and reason are true but reason is not the correct explanation of the assertion.
- (c) If assertion is true but reason is false.
- (d) If the assertion and reason both are false.
- (e) If assertion is false but reason is true.

1. Assertion : Calgon is used for removing Ca^{2+} and Mg^{2+} ions from hard water.

Reason : Calgon forms precipitates with Ca^{2+} and Mg^{2+} .

2. Assertion : H_2O_2 is not stored in glass bottles.

Reason : Alkali oxides present in glass catalyse the decomposition of H_2O_2 .

3. Assertion : The O–O bond length in H_2O_2 is shorter than that of O_2F_2 .

Reason : H_2O_2 is an ionic compound.

[AIIMS 2003]

4. Assertion : A nearly tetrahedral arrangement of the orbitals about the oxygen atom allows each water molecule to form hydrogen bonds with as many as four neighbouring water molecules.

Reason : In ice each water molecule form four hydrogen bond as each molecule is fixed in the space.

10. Hydrogen – Answers Keys

1. Hydrogen

1	a	2	c	3	b	4	d	5	d
6	a	7	b	8	c	9	b	10	b
11	c	12	a	13	a	14	c	15	d
16	a	17	c	18	a	19	d	20	c
21	b	22	d	23	c	24	d	25	c
26	b	27	a	28	c	29	b	30	c
31	b	32	c	33	a	34	a		

2. Water or Hydride of Oxygen

1	a	2	b	3	b	4	c	5	c
6	c	7	d	8	d	9	a	10	a
11	a	12	c	13	b	14	b	15	d
16	c	17	c	18	a	19	c	20	c
21	e	22	c	23	a	24	a	25	b
26	a	27	c	28	c	29	d	30	b
31	c	32	c	33	b				

3. Hydrogen Peroxide

1	c	2	b	3	b	4	c	5	b
6	b	7	c	8	b	9	c	10	d
11	b	12	d	13	c	14	b	15	b
16	a	17	a	18	e	19	a	20	a
21	c	22	d	23	b	24	b		

4. IIT-JEE/ AIEEE

1	a	2	d	3	b	4	d	5	b
6	c	7	b	8	c	9	a	10	a
11	c	12	a	13	b				

5. NEET/ AIPMT/ CBSE-PMT

1	c	2	b	3	ad	4	c	5	a
6	a	7	d	8	a	9	a	10	a

6. AIIMS

1	b	2	d	3	a	4	b	5	c
6	a								

7. Assertion & Reason

1	d	2	a	3	d	4	a		
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