

ONLY ONE OPTION CORRECT TYPE

- 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 resembles 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.
- Metal hydrides are ionic, covalent or molecular in nature. Among LiH, NaH, KH, RbH, CsH, the correct order of increasing ionic character is
 - LiH > NaH > CsH > KH > RbH
 - LiH < NaH < KH < RbH < CsH
 - RbH > CsH > NaH > KH > LiH
 - NaH > CsH > RbH > LiH > KH
- Which of the following hydrides is electron precise?
 - B_2H_6
 - NH_3
 - H_2O
 - CH_4
- Consider the reactions:
 - $H_2O_2 + 2HI \rightarrow I_2 + 2H_2O$
 - $HOCl + H_2O_2 \rightarrow H_3O^+ + Cl^- + O_2$Which of the following statements is correct about H_2O_2 with reference to these reactions? Hydrogen peroxide is _____.
 - an oxidizing agent in both (A) and (B)
 - an oxidizing agent in (A) and reducing agent in (B)
 - a reducing agent in (A) and oxidizing agent in (B)
 - a reducing agent in both (A) and (B)
- The oxide that gives H_2O_2 on treatment with dilute H_2SO_4 is
 - PbO_2
 - $BaO_2 \cdot 8H_2O$
 - MnO_2
 - TiO_2
- Which of the following equation depicts reducing nature of H_2O_2 ?
 - $2[Fe(CN)_6]^{4-} + 2H^+ + H_2O_2 \rightarrow [Fe(CN)_6]^{3-} + 2H_2O$
 - $I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$
 - $Mn^{2+} + H_2O_2 \rightarrow Mn^{4+} + 2OH^-$
 - $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$
- Which of the following reactions increases production of dihydrogen from synthesis gas?
 - $CH_{4(g)} + H_{2O(g)} \xrightarrow[Ni]{1270K} CO_{(g)} + 3H_{2(g)}$
 - $C_{(s)} + H_{2O(g)} \xrightarrow{1270K} CO_{(g)} + H_{2(g)}$
 - $CO_{(g)} + H_{2O(g)} \xrightarrow[Catalyst]{673K} CO_{2(g)} + H_{2(g)}$
 - $C_2H_{6(g)} + 2H_{2(g)}O \xrightarrow[Ni]{1270K} 2CO_{(g)} + 5H_{2(g)}$
- 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

9. Hydrogen peroxide is obtained by the electrolysis of _____.
 (a) water (b) sulphuric acid
 (c) hydrochloric acid (d) fused sodium peroxide
10. Which of the following ions will cause hardness in water sample?
 (a) Ca^{2+} (b) Na^+ (c) Cl^- (d) K^+
11. Which of the following compounds is used for water softening?
 (a) $\text{Ca}_3(\text{PO}_4)_2$ (b) Na_3PO_4 (c) $\text{Na}_6\text{P}_6\text{O}_{18}$ (d) Na_2HPO_4
12. Elements of which of the following group(s) of period table do not form hydrides.
 (a) Groups 7, 8, 9 (b) Group 13 (c) Groups 15, 16, 17 (d) Group 14
13. Only one element of _____ forms hydride.
 (a) group 6 (b) group 7 (c) group 8 (d) group 9
14. Choose the correct option as directed.
 (a) $\text{CsH} < \text{KH} < \text{NaH} < \text{LiH}$ (Order of reducing strength)
 (b) $\text{H}_2\text{O} < \text{NH}_3 < \text{CH}_4$ (Order of dipole moment)
 (c) $\text{PH}_3 < \text{AsH}_3 < \text{NH}_3 < \text{SbH}_3$ (Order of boiling point)
 (d) $\text{X} - - - \text{H} - \text{X}, \text{X} = \text{O} > \text{F} > \text{N} > \text{S} > \text{Cl}$ (Order of strength of H-bonding)
15. The molecular formula of a commercial resin used for exchanging ions in water softening is $\text{C}_8\text{H}_7\text{SO}_3\text{Na}$ (Mol. wt. 206). What would be the maximum uptake of Ca^{2+} ions by the resin when expressed in mole per gram resin?
 (a) $\frac{2}{309}$ (b) $\frac{1}{412}$ (c) $\frac{1}{103}$ (d) $\frac{1}{206}$
16. Which of the following is not true?
 (a) Ordinary water is electrolysed more rapidly than D_2O
 (b) Reaction between H_2 and Cl_2 is much faster than D_2 and Cl_2 .
 (c) D_2O freezes at lower temperature than H_2O .
 (d) Bond dissociation energy for D_2 is greater than H_2 .
17. A statement about heavy water are given below.
 A. Heavy water is used in exchange reactions for the study of reaction mechanisms.
 B. Heavy water is prepared by exhaustive electrolysis of water.
 C. Heavy water has higher boiling point than ordinary water.
 D. Viscosity of H_2O is greater than D_2O .
 Choose the most appropriate answer from the options given below.
 (a) A and C only (b) A and D only (c) A and B only (d) A, B and C only
18. Hydrogen peroxide reacts with iodine in basic medium to give
 (a) IO^- (b) IO_3^- (c) I^- (d) IO_4^-
19. Which of the following reactions produces hydrogen?
 (a) $\text{Mg} + \text{H}_2\text{O}$ (b) $\text{H}_2\text{S}_2\text{O}_8 + \text{H}_2\text{O}$ (c) $\text{BaO}_2 + \text{HCl}$ (d) $\text{Na}_2\text{O}_2 + 2\text{HCl}$
20. Non-stoichiometric hydrides are formed by
 (a) palladium, vanadium (b) manganese, lithium (c) nitrogen, fluorine (d) carbon, nickel

21. Identify the reaction which does not liberate hydrogen.
- Reaction of lithium hydride with B_2H_6 .
 - Electrolysis of acidified water using Pt electrodes.
 - Reaction of zinc with aqueous alkali.
 - Allowing a solution of sodium in liquid ammonia to stand.
22. The correct statement among (I) to (IV) are:
- saline hydrides produce H_2 gas when reacted with H_2O .
 - reaction of $LiAlH_4$ with BF_3 leads to B_2H_6 .
 - PH_3 and CH_4 are electron – rich and electron- precise hydrides, respectively.
 - HF and CH_4 are called as molecular hydrides.
- I, II, III and IV
 - III and IV only
 - I, III and IV only
 - I, II and III only
23. The method used to remove temporary hardness of water is
- synthetic resins method
 - Calgon's method
 - Clark's method
 - ion-exchange method
24. The number of hydrogen bonded water molecule (s) associated with $CuSO_4 \cdot 5H_2O$ is
- 3
 - 1
 - 2
 - 5
25. The temporary hardness of water sample is due to compound X. Boiling this sample converts X to compound Y. X and Y respectively, are
- $Ca(HCO_3)_2$ and $Ca(OH)_2$
 - $Mg(HCO_3)_2$ and $MgCO_3$
 - $Mg(HCO_3)_2$ and $Mg(OH)_2$
 - $Ca(HCO_3)_2$ and CaO
26. From the following statements regarding H_2O_2 , choose the incorrect statement.
- It has to be stored in plastic or wax lined glass bottles in dark.
 - It has to be kept away from dust.
 - It can act only as an oxidizing agent.
 - It decomposes on exposure to light.
27. The chemical nature of hydrogen peroxide is
- oxidizing and reducing agent in both acidic and basic medium
 - oxidizing agent in acidic medium, but not in basic medium
 - oxidizing and reducing agent in both acidic medium but not in basic medium
 - reducing agent in basic medium, but not in acidic medium
28. The volume strength of 1 M H_2O_2 is (molar mass of $H_2O_2 = 34 \text{ g mol}^{-1}$)
- 22.4
 - 16.8
 - 5.6
 - 11.35
29. Some statement about heavy water are given below:
- Heavy water is used as a moderator in nuclear reactors.
 - Heavy water is more associated than ordinary water.
 - Heavy water is more effective solvent than ordinary water.
- Which of the above statements are correct?
- (i) and (ii)
 - (i), (ii) and (iii)
 - (ii) and (iii)
 - (i) and (iii)
30. In acidic medium, H_2O_2 acts as a reducing agent in its reaction with
- $FeSO_4$
 - $KMnO_4$
 - K_2MnO_4
 - $K_4[Fe(CN)_6]$

Answer Key

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
D	B	D	B	B	B	C	D	B	A
11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
C	A	A	C	B	C	D	B	A	A
21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
A	A	C	B	C	C	A	D	A	B