Hydrogen and Its compounds

SET Self Evaluation Test - 17

1. Temperature of maximum density in H_2O and D_2O respectively are

(a) 277.15 K, 284.75 K

(b) 273.15 K, 277.15 K

(c) 277.15 K, 285.75 K

(d) 284.75 K, 277.15 K

2. Non-metallic oxides dissolves in water to form

(a) Acidic solution

(b) Alkaline solution

(c) Neutral solution

(d) None of these

3. 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

4. Brackish water mostly contains

(a) Calcium chloride (b) Barium sulphate

(c) Sodium chloride (d) Mineral acids

5. $TiH_{1.73}$ is an example of

(a) Ionic hydride

(b) Covalent hydride

(c) Metallic hydride

(d) Polymeric hydride

6. The volume strength of perhydrol is

(a) 20 (b) 30

(c) 100 (d) 10

7. The solubility of an ionic compound is compared in heavy and simple water. It is

(a) Higher in heavy water

(b) Lower in heavy water

(c) Same in heavy water and simple water

(d) Lower in simple water

8. Which of the following cannot be reduced by H_2O_2

(a) Ag_2O

(b) Fe^{3+}

(c) Acidified $KMnO_4$

(d) Acidified $K_2Cr_2O_7$

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

(a) Copper (b) Iron

(c) Lead (d) Mercury

10. The element whose hydride contains maximum number of hydrogen per atom of the element is

(a) Na (b) O

(c) B (d) Si

11. Indicator type silica gel used as a dehumidifier contains

(a) Cu^{2+} ions (b) Ni^{2+} ions

(c) Co^{2+} ions (d) Fe^{2+} ions

12. 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

13. 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

14. Which of the following cannot be used for the preparation of H_2

(a) $Zn + HCl(dil.) \rightarrow$

(b) $NaH + H_2O \rightarrow$

(c) $Zn + HNO_3(dil.) \rightarrow$

(d) $HCOONa \xrightarrow{\Delta}$

15. The process used for the removal hardness of water is

[EAMCET 2001]

(a) Calgon (b) Baeyer

(c) Serpeck (d) Hoope

Answers and Solutions

(SET -17)

1. (a) Temperature of maximum density of H_2O is 277.15 K.

Temperature of maximum density of D_2O is 284.75 K.

2. (a) Non metallic oxides in water are form acidic solutions *e.g.* $P_2O_5 + 3H_2O \rightarrow \underset{\text{phosphoric acid}}{2H_3PO_4}$

3. (c) Ordinary water absorbs fast moving neutrons, thus stopping the process of nuclear fission.

4. (c) Brackish water mostly contains sodium chloride.

5. (c) It is a metallic hydride.

6. (c) The volume strength of perhydral is 100

perhydral is 30% H_2O_2

10 vol. $H_2O_2 \equiv 3\% H_2O_2$

$\therefore$ 30% of $H_2O_2 \equiv 100$ vol. H_2O_2

7. (b) The solubility of an ionic compound is more in simple water and less in heavy water.

8. (b) H_2O_2 cannot reduce Fe^{3+}. All other compounds are reduced by H_2O_2.

9. (b) Hydrogen cannot be prepared by the action of dil. H_2SO_4 on copper or mercury as these two metals cannot displace hydrogen from acids. Action of dil. H_2SO_4 are stops after sometimes due to the formation of insoluble $PbSO_4$. Only, iron reacts rapidly with dil. H_2SO_4 to give H_2.

10. (d) Hydride of $Si(SiH_4)$ contains more hydrogen atoms than hydrides of $Na(NaH), O(H_2O), B(BH_3)$.

11. (c) Indicator type of gel used as a dehumidifier contains CO^{2+} ions, when dry it is blue in colour and on absorbing moisture it becomes pink.

12. (d) $2AgNO_3(aq) + 2NaOH(aq) \rightarrow$

$$\underset{\text{Brown ppt.}}{Ag_2O(s)} + H_2O(l) + 2NaNO_3(aq)$$

$$Ag_2O(s) + H_2O_2(aq) \rightarrow H_2O(l) + O_2(g) + \underset{\text{Black ppt.}}{2Ag(s)}$$

The finely divided Ag is black in colour.

13. (b) Atomic hydrogen reacts with oxygen to give almost pure hydrogen peroxide.

$2[H] + O_2 \rightarrow H_2O_2$

14. (c) $Zn + 2HCl(dil.) \rightarrow ZnCl_2 + H_2$

$NaH + H_2O \rightarrow NaOH + H_2$

$2HCOONa \xrightarrow{\Delta} \underset{\text{sodium oxalate}}{Na_2C_2O_4} + H_2$

$4Zn + 10HNO_3 dil. \rightarrow 4Zn(NO_3)_2 + N_2O + 5H_2O$

*****15.** (a) Calgon process is used for the removal of hardness of water.