



IV. Multiple Choice Questions

Question 1. Hydrogen gas is generally prepared by the

- (a) reaction of granulated zinc with dilute H_2SO_4
- (b) reaction of zinc with cone. H_2SO_4
- (c) reaction of pure zinc with dil. H_2SO_4
- (d) action of steam on red hot coke.

Question 2. Hydrogen peroxide is used as

- (a) an oxidizing agent
- (b) a reducing agent
- (c) a bleaching agent
- (d) all of the above

Question 3. Water may be softened using

- (a) sodium aluminium silicate
- (b) Graham's salt
- (c) an ion exchange resin
- (d) trisodium phosphate
- (e) all of the above

Question 4. On treatment of hard water with zeolite, sodium ions get exchanged with

- (a) Ca^{2+} ions
- (b) Mg^{2+} ions
- (c) H^+ ions
- (d) OH^-

Question 5. Calgon, which is used as a water softener, has the formula

- (a) $\text{Na}_4 [\text{Na}_2(\text{PO}_3)_6]$
- (b) $\text{Na}_2 [\text{Na}_4 (\text{PO}_3)_6]$
- (c) $\text{Na}_2 [\text{Na}_4 (\text{PO}_4)_5]$
- (d) $\text{Na}_2 [\text{Na}_2 (\text{PO}_4)_6]$

Question 6. The higher density of water than that of ice is due to

- (a) dipole-dipole interaction
- (b) dipole-induced dipole interaction
- (c) hydrogen bonding
- (d) all of these

Question 7. Hydrogen is obtained as a by-product in the

- (a) electrolysis of water
- (b) manufacture of caustic soda
- (c) Bosch process
- (d) Lane process

Question 8. Zeolite is

- (a) hydrated sodium aluminium silicate - $\text{Na}_2\text{Al}_2\text{Si}_2\text{O}_8 \cdot x\text{H}_2\text{O}$
- (b) hydrated ferric oxide
- (c) sodium hexametaphosphate
- (d) sodium tetraborate

Question 9. Water undergoes self-ionization to a small extent to give

- (a) H^+ and OH^-
- (b) OH^+ and H^-
- (c) H_3O^+ and OH^-
- (d) none of the above

Question 10. The decomposition of H_2O_2 is retarded by

- (a) acetanilide
- (b) glycerol

- (c) sodium bicarbonate
- (d) oxalic acid

Answer:

1. (a)
2. (d)
3. (e)
4. (a) and (b)
5. (b)
6. (c)
7. (b)
8. (a)
9. (c)
10. (a) and (b)

IV. Hots Questions

Question 1. Account for the following:

- (a) Can phosphorus with electronic configuration $3s^2 3p^3$ form PH_5 ?
- (b) Water is responsible for moderation of body temperature. How?
- (c) Hard water is not suitable for boilers as well as for laundry.

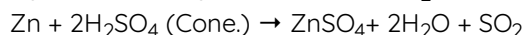
Answer:

- (a) High $\Delta_f H$ value of dihydrogen and less negative value of $\Delta_{eg} H$ of hydrogen do not favour to exhibit highest oxidation state of P and consequently the formation of PH_5 , although P exhibit +3, +5 oxidation states.
- (b) Because of high heat of vapourisation and high heat capacity.
- (c) Hard water form precipitate with soap and deposition of salts in the form of scales.

Question 2. Can we use concentrated sulphuric acid and pure zinc in the preparation of dihydrogen? Write the chemical reactions to show the amphoteric nature of water. Why is hydrogen peroxide stored in wax-lined plastic coloured bottles?

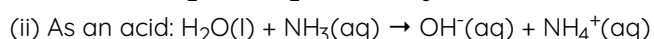
Answer:

- (a) Cone. H_2SO_4 cannot be used because it acts as an oxidizing agent also and gets reduced to SO_2 .



Pure Zn is not used because it is non-porous and reaction will be slow. The impurities in Zn help in constitute of electrochemical couple and speed up reaction.

- (b) Water is amphoteric in nature and it behaves both as an acid as well as base. With acids stronger than itself (e.g., H_2S) it behaves as a base and with bases stronger than itself (e.g., NH_3) it acts as an acid.



- (c) The decomposition of H_2O_2 occurs readily in the presence of rough surface (acting as catalyst). It is also decomposed by exposure of light. Therefore, waxlined smooth surface and coloured bottles retard the decomposition of H_2O_2 .

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