CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

HYDROGEN

Level I Homework

1. Hydrogen is (1) Electropositive (2) Electronegative (3) Neither electropositive nor electronegative (4) Both electro positive as well as electronegative

A. Electropositive

B. Electronegative

C. Neither electropositive nor electronegative

D. Both electro positive as well as electronegative

Answer:

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2. The oxidation states exhibited by hydrogen in its various compounds are

A. -1 only

B. $+2$

C. $+1, \ -1$ and zero

D. $+1$ only

Answer:

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3. Reaction between following pairs will produce hydrogen except

A. $Cu + HCl$

B. $Fe + H_2O(g)$

C. $Mg + H_2O(\text{hot})$

D. $Na + \text{alcohol}$

Answer:

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4. SiH_4 is an example of which of the following type of hydrides (1) Ionic (2) Interstitial (3) Metallic (4) Covalent

A. ionic

B. interstitial

C. metallic

D. covalent

Answer:

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5. Hydrogen accept an electron to form inert gas configuration. In this, it resembles

A. Halogen

B. Alkali metals

C. Chalcogens

D. Alkaline earth metals

Answer:

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6. Which of the following statements is correct?

A. Hydrogen has same ionisation potential as alkali metals

B. H^- has same electronegativity as halogens

C. H^- has oxidation number of -1

D. H_2 will not be liberated at anode

Answer:

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7. In Bosch's process, which gas is utilised for the production of hydrogen?

A. Producer gas

B. Water gas

C. Coal gas

D. Natural gas

Answer:

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8. Dihydrogen in H_2 has

A. Two isotopes and no isomers

B. Three isotopes and two nuclear isomers

C. Three isotopes and two optical isomers

D. Two isotopes and two geometrical isomers

Answer:

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9. Ionic hydrides react with water to give

A. Hydride ions

B. Acidic solution

C. Protons

D. Basic solution

Answer:

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10. Hydrogen burns in air with a

A. Light bluish flame

B. Yellow flame

C. Green flame

D. None of these

Answer:

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11. Hard water contains ions of

A. Heavy water

B. Soft water

C. Hard water

D. Conductivity water

Answer:

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12. Temporary hardness of water is due to the presence of

A. $MgSO_4$

B. $Mg(HCO_3)_2$

C. $CaCl_2$

D. $CaCO_3$

Answer:

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13. Which of the following will cause softening of hard water?

A. Passing it through anion exchange resin

B. Passing it through sand

C. Passing it through cation exchange resin

D. Passing it through alumina

Answer:

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14. Select the correct statement for heavy water

A. it is less denser than common water

B. it is an oxide of deuterium

C. it is heavy or bad taste

D. it has a heavier isotope of oxygen

Answer:

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15. Fluorine react with water to form

A. Fluorine water

B. Oxygen

C. Ozone

D. Oxygen, ozone

Answer:

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16. Water has maximum density at

A. $100^{\circ} C$

B. $25^{\circ}C$

C. $4^{\circ}C$

D. $0^{\circ}C$

Answer:

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17. The hydride ion H^{-} is a stronger base than hydroxide ion, which of the following reactions will occur sodium hydride (NaH) is dissolved in water?

A. $H^{-}(aq) + H_2O(l) \rightarrow H_3O^{+}(aq)$

B. $H^{-}(aq) + H_2O(l) \rightarrow OH^{-}(aq) + H_2(g)$

C. $H^{-}(aq) + H_2O(l) \rightarrow \text{no reaction}$

D. None of these

Answer:

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18. What is formed when calcium carbide react with heavy water

A. C_2D_2

B. CaD_2

C. Ca_2D_2O

D. CD_2

Answer:

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19. Deuterium was discovered by

A. Urey

B. Aston

C. Rutherford

D. Chadwick

Answer:

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20. Amongst H_2O, H_2S, H_2Se and H_2Te, the one with the highest boiling point is: H_2O because of hydrogen bonding, H_2Te because of higher molecular weight, H_2S because of hydrogen bonding, H_2Se because of lower molecular weight.

A. H_2O because of hydrogen bonding

B. H_2Te because of higher molecular weight

C. H_2S because of hydrogen bonding

D. H_2Se because of lower molecular weight

Answer:

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21. An oxide which give H_2O_2 on treatment with dilute acid is

A. PbO_2

B. Na_2O_2

C. MnO_2

D. TiO_2

Answer:

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22. The maximum number of hydrogen bonds formed by a water molecule in ice is

A. 4

B. 3

C. 2

D. 1

Answer:

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23. Bleaching action of H_2O_2 is due to it's

A. Oxidising nature

B. Reducing nature

C. Acidic nature

D. Thermal insteability

Answer:

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24. A dilute solution of H_2O_2 is labelled as 20 volume. It's percentage strength is

A. $10\ \%$

B. $6.06\ \%$

C. $30\ \%$

D. $3\ \%$

Answer:

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25. Polyphosphates are used as water softening agents because they

A. Form soluble complexes with anionic species

B. Precipitate anionic species

C. Form soluble complexes with cationic species

D. Precipitate cationic species

Answer:

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26. A mixture of hydrazine and H_2O_2 is used as

A. Antiseptic

B. rocket fuel

C. Antidepressant

D. insecticide

Answer:

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27. Decomposition of H_2O_2 is retarded by

A. Acetanilide

B. MnO_2

C. Zn

D. Colloidal Ni

Answer:

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28. Pure H_2O_2 is

A. semi solid

B. liquid

C. solid

D. gas

Answer:

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29. Barium peroxide reacts with phosphoric acid to produce barium phosphate along with

A. water

B. hydrogen peroxide

C. dioxygen

D. phosphine

Answer:

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30. Which of the following compounds turn white on treatment with H_2O_2

A. Ag_2S

B. PbS

C. NiS

D. CuS

Answer:

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Level Ii

1. Which is false : Hydrogen act both as oxidiser and reducer, Ortho and para hydrogen are nuclear spin isomers, H_2 is more rapidly adsorbed on surface than D_2, Isotopes of hydrogen resemble in physical properties but differ in chemical properties

A. Hydrogen act both as oxidiser and reducer

B. Ortho and para hydrogen are nuclear spin isomers

C. H_2 is more rapidly adsorbed on surface than D_2

D. Isotopes of hydrogen resemble in physical properties but differ in chemical properties

Answer:

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2. In which of the following does hydrogen resembles halogens?

1) Absence of unshared electron pair

2) Formation of covalent compounds

3) Liberation of anode

4) Electronegative character

5) Reducing character

A. 1, 2 and 3

B. 2, 3 and 4

C. 1, 2 and 4

D. 1, 2 and 5

Answer:

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3. Which of the following is correct order

1) $T_2 > D_2 > H_2$ (order of BP) 2) $T_2 > D_2 > H_2(\text{order of BE})$

3) $T_2 = D_2 = H_2(\text{order of BL})$ 4) $T_2 < D_2 < H_2$ (order of reactivity with chlorine) : 1, 2 and 3, 1, 2, 3 and 4, 1 and 3, 2, 3 and 4

A. 1, 2 and 3

B. 1, 2, 3 and 4

C. 1 and 3

D. 2, 3 and 4

Answer:

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4. Bosch method for the manufacture of hydrogen involve : electrolysis of acidulated water, passing steam through natural gas, Coal gasification

followed by water gas shift of reaction, Gassing process followed by vivifaction

A. electrolysis of acidulated water

B. passing steam through natural gas

C. Coal gasification followed by water gas shift of reaction

D. Gassing process followed by vivifaction

Answer:

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5. Which of the following is incorrect?

1) Hydrogen forms covalent hydrides with most p-block elements

2) Hydrides of group-13 are electron rich

3) Metallic hydrides obey law of constant proportions

4) Metallic hydrides are used in catalytic reduction

5) Ni, Pt and Pd absorb very low volume hydrogen (a) 2 and 3 (b) 1,2 and 3

(c) 2,4, and 5 (d) 2,3,and 5

A. 2 and 3

B. 1, 2 and 3

C. 2, 4 and 5

D. 2, 3 and 5

Answer:

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6. Which is not true about saline hydrides

A. They are binary compounds of hydrogen and metallic elements

B. They are crystalline solids

C. They conduct electricity only in molten and they react with water state

D. The density of ionic hydrides is lower than those of metals from which they are formed

Answer:

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7. An oxide which give H_2O_2 on treatment with dilute acid is

A. PbO_2

B. Na_2O_2

C. MnO_2

D. TiO_2

Answer:

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8. Hydrolysis of one mole of peroxydisulphuric acid produces

A. Two moles of sulphuric acid

B. Two moles of peroxomonosulphuric acid

C. Two moles of sulphuric acid and one mole of hydrogen peroxide

D. One mole of sulphuric acid, one mole of peroxomonosulphuric acid and one mole of hydrogen peroxide

Answer:

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9. Pure hydrogen is obtained by the action of (1) Pure dilute H2SO4 on magnesium ribbon. (2) Electrolysis of warm solution of Ba(OH)2. (3) Water on sodium hydride (4) All the above

A. pure dilute H_2SO_4 on magnesium ribbon

B. electrolysis of warm solution of $Ba(OH)_2$

C. Water on sodium hydride

D. All the above

Answer:

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10. Which is incorrect?

A. water contracts on heating from 273 to 277 K

B. petrol fire cannot be extinguished by water

C. water has high dipole moment and dielectric constant

D. water makes intramolecular hydrogen bonding

Answer:

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11. Which of the following relates to the chemical behaviours of water?

1) Stable nature 2) Oxidising and reducing nature

3) Hydrolytic nature 4) Hydrate formation

5) Acid-base character (a) 1 and 2 (b) 1 and 5 (c) all these (d) 3 and 5

A. 1 and 2

B. 1 and 5

C. all these

D. 3 and 5

Answer:

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12. Which of the following is incorrect?

A. Hardness of water depends on it's soap consuming power

B. Permanent hardness is due to chlorides and sulphates of calcium and magnesium

C. Hardness is determined by disodium salt of EDTA

D. Temporary hardness can be removed by washing soda

Answer:

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13. Ice melts below $0^{\circ}C$ when pressure is applied because : pressure generates heat, chemical bonds breaks under pressure, ice is less denser than water, ice is not a true solid

A. pressure generates heat

B. chemical bonds breaks under pressure

C. ice is less denser than water

D. ice is not a true solid

Answer:

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14. Heavy water is manufacture by

A. Combination of hydrogen and heavier isotope of oxygen

B. Electrolysis of water containing heavy hydrogen dissolved in it

C. Repeated electrolysis of 3% aqueous solution of NaOH

D. None of the above

Answer:

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15. If 10 cm^3 solution of H_2O_2 on decomposition gives 150 cm^3 of O_2 at STP, then volume strength of H_2O_2 is

A. 15

B. 30

C. 20

D. 10

Answer:

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16. Which is not true about heavy water?

A. most of the physical constant values are higher than the corresponding values of ordinary water

B. rate of chemical reactions are slower than those in ordinary water

C. it is obtained as a byproduct in some fertilizer industries

D. it is obtained by the electrolysis of acidified water

Answer:

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17. Deionised water is obtained by passing hard water through

A. zeolite

B. cation exchanger

C. anion exchanger

D. both cation and anion exchanger one after the other

Answer:

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18. Which of the following is/are the preparation or manufacture of H_2O_2

1) Mercks's process 2) Thenard's process

3) Electrolysis of 50% of H_2SO_4 $4)$ Auto-oxidation of 2-alkyl anthraquinol

5) Oxidation of isopropyl alcohol

A. 1 and 2

B. 1, 2 and 3

C. 1, 2, 3 and 4

D. all these

Answer:

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19. H_2O_2 act as reducing agent when it reacts with

A. PbS in acidic medium

B. $FeSO_4$ in basic medium

C. $MnSO_4$ in basic medium

D. $KMnO_4$ in basic medium

Answer:

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20. H_2O_2 is used

A. to bleach delicate materials

B. as an antichlor and in the manufacture of detergents

C. for detecting titanium and chromium salts

D. all the above

Answer:

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21. Acidified $KMnO_4$ solution is decolourised when

A. H_2 is passed through it

B. Zinc is added to it

C. Chlorine is passed through it

D. none of the above

Answer:

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22. The volume of O_2 (measured at STP) liberated by 1 mL 1M H_2O_2 is

A. 22.4 ml

B. 11.2 ml

C. 44.8 ml

D. 40 ml

Answer:

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23. 100 cm^3 of a sample of H_2O_2 gives 1000 cm^3 of O_2 at STP. The given sample is

A. 10 volume H_2O_2

B. 100 volume H_2O_2

C. 10% H_2O_2

D. 2.786 N H_2O_2

Answer:

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24. What is the volume of "20 volume of H_2O_2" is required to get 5000 cm^3 of oxygen at STP?

A. 125 cm^3

B. 100 cm^3

C. 50 cm^3

D. 250 cm^3

Answer:

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25. Find the true statement

A. when H_2O_2 solution is poured into a skin wound to clean it, it bubbles furiosly

B. carbon forms more compounds than hydrogen

C. nascent hydrogen cannot decolorise $KMnO_4$ solution

D. Smell of HNO_2 and H_2O_2 differ

Answer:

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26. Hydrogen peroxide (or any true peroxide) can be identified by

A. Chromyl chloride test

B. Baeyer's test

C. Silver mirror test

D. Perchromic acid test

Answer:

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27. 100 ml of a sample of H_2O_2 by dissociation yielded 560 ml O_2 at NTP. The molarity and volume strength of the sample of H_2O_2 is respectively

A. 0.5 and 5.6

B. 1 and 11.2

C. 10 and 112

D. 20 and 224

Answer:

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28. Which one of the following statements is not correct for ortho and para hydrogen?

A. They have different boiling points

B. Ortho form is more stable than the para form

C. They differ in the spin of their protons

D. The ratio of ortho to para hydrogen increases with increase in temperature

Answer: D

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29. If 10 cm^3 solution of H_2O_2 on decomposition gives 150 cm^3 of O_2 at STP, then volume strength of H_2O_2 is

A. 15

B. 30

C. 20

D. 10

Answer: A

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30. Which of the following is not correct for D_2O?

A. Boiling point is higher than H_2O

B. D_2O reacts slowly than H_2O

C. Viscosity is higher than H_2O at $25^\circ C$

D. Solubility of $NaCl$ in D_2O is more than H_2O

Answer: D

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31. Why does H^+ ion always get associated with other atoms or molecules?

A. Ionisation enthalpy of hydrogen resembles thatofalkali metals .

B. Its reactivity is similar to halogens

C. It resembles both alkali metals and halogens

D. Loss of an electron from hydrogen atom results in anucleus of very small size as compared to other atoms orions. Due to small size it cannot exist free

Answer: D

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32. Metallic hydrides are useful for hydrogen storage because

A. they reacts with hydrogen and form stable compound

B. they absorb H-atoms

C. they adsorb H-atoms

D. they form unstable compounds with hydrogen

Answer: C

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33. Which of the following is not true?

A. D_2O freezes at lower temperature than H_2O

B. Reaction between H_2 and Cl_2 is much faster than D_2 and CI_2

C. Ordinary water electrolysed more rapidly than D_2O

D. Bond dissociation energy of D_2 is greater than H_2

Answer: A

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34. The increasing order of reducing property of NaH, MgH_2 and H_2O is

A. $NaH < H_2O < MgH_2$

B. $MgH_2 < H_2O < NaH$

C. $H_2O < MgH_2 < NaH$

D. $NaH < MgH_2 < H_2O$

Answer: C

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35. In context with the industrial preparation of hydrogen from water gas $(CO + H_2)$, which of the following is the correct statement? : CO and H_2 are fractionally separated using differences in their densities. , CO is removed by absorption in aqueous Cu_2Cl_2 solution. , H_2 is removed through occlusion with Pd. , CO is oxidized to CO_2 with

steam in the presence of a catalyst followed by absorption of CO_2 in alkali.

A. CO and H_2 are fractionally separated using differences in their densities.

B. CO is removed by absorption in aqueous Cu_2Cl_2 solution.

C. H_2 is removed through occlusion with Pd.

D. CO is oxidized to CO_2 with steam in the presence of a catalyst followed by absorption of CO_2 in alkali.

Answer: D

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36. An element that does not form stable hydride is

A. Al

B. Fe

C. Li

D. Na

Answer: A

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

A. CaO

B. $Ca(OH)_2$

C. $CaCO_3$

D. $Ca(HCO_3)_2$

Answer: B

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38. In which of the following reactions H_2O_2 acts as a reducing agent?

$i)\, H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$ $\quad ii)\, H_2O_2 - 2e^- \rightarrow O_2 + 2H^+$

$iii)\, H_2O_2 + 2e^- \rightarrow 2OH^-$ $\quad iv)\, H_2O_2 + 2OH^- - 2e^- \rightarrow O_2 + 2H_2O$

A. i), ii)

B. iii), iv)

C. i), iii)

D. ii), iv)

Answer: D

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39. Find the percentage strength of H_2O_2 in a sample marked "10 volumes."

A. $3\ \%$

B. $0.5\ \%$

C. $0.1\ \%$

D. $0.15\ \%$

Answer: A

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40. Hydrogen molecule differs from chlorine molecule in the following respect:

A. Hydrogen molecule is non-polar but chlorine molecule is polar

B. Hydrogen molecule is polar while chlorine molecule is non-polar

C. Hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not

D. Hydrogen molecule cannot participate in coordination bond formation but chlorine molecule can

Answer: D

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41. High dipole moment of water justifies that

A. it is not linear molecule

B. it is a universal solvent

C. it has higher density than ice

D. it is neutral toward litmus

Answer: A

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42. Which of the following is correct about heavy water?

A. Water at $4^{\circ} C$ having maximum density is known as heavy water

B. It is heavier than water

C. It is formed by the combination of heavier isotope of hydrogen and oxygen

D. Both B and C

Answer: D

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43. The atom of oxygen lost by H_2O_2 molecule during oxidation reaction is that which is linked through

A. an electrovalent bond

B. a covalent bond

C. a coordinate bond

D. a hydrogen bond

Answer: B

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44. In which of the following reactions does dihydrogen act as an oxidising agent?

A. $Ca + H_2 \rightarrow CaH_2$

B. $2H_2 + O_2 \rightarrow 2H_2O$

C. $H_2 + F_2 \rightarrow 2HF$

D. $CuO + H_2 \rightarrow Cu + H_2O$

Answer: A

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45. The melting points of most of the solid substances increase with an increase of pressure acting on them. However, ice melts at a temperature lower than its usual melting point when the pressure is increased. This is because:

A. ice is less dense than water

B. it generates heat

C. chemical bonds break under pressure

D. none

Answer: A

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46. When 50%solution of H_2SO_4 is electrolysed by passing a current of high density at low temperature the main products of electrolysis are:

A. oxygen and hydrogen

B. H_2 and peroxo disulphuric acid

C. H_2 and SO_2

D. O_2 and peroxy disulphuric acid

Answer: B

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47. $100mL$of $0.01MKMnO_4$ oxidises $100mLH_2O$, in acidic medium. Volume of the same $KMnO_4$ required in alkaline medium to oxidise 100 mL of the same H_2O_2 will be (MnO_4^- changes to Mn^{2+} in acidic medium and to MnO_2 in alkaline medium)

A. $\frac{100}{3}mL$

B. $\frac{500}{3}mL$

C. $\frac{300}{5}mL$

D. $\frac{100}{5}mL$

Answer: B

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48. 10mL of H_2O_2 solution (volume strength=x) requires-10 mL of $N/0.56MnO_4^-$ solution in acidic medium. Hence x is

A. 0.56

B. 5.6

C. 0.1

D. 10

Answer: D

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49. 10L of hard water required 0.56 goflime (CaO) for removing hardness. Hence, temporary hardness in ppm (part per million, 10%) of $CaCO_3$ is

A. 100

B. 200

C. 10

D. 20

Answer: B

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50. Match List- I with List-II and select the correct answer using the codes given below in 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 wa

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51. Consider LiH, MgH_2 and CuH:

A. all are ionic hydrides

B. LiH, MgH_2 are ionic, whereas CuH is covalent

C. LiH, MgH_2 are ionic, whereas $CuH$is metallic

D. LiH is ionic, MgH_2 is covalent and CuH is metallic

Answer: D

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52. Which statements is/are correct?

A. Boiling point of H_2O, NH_3, HF are maximum in their respective group due to intermolecular H-bonding

B. Boiling point of $CH_4$is lower out of CH_4, SiH_4, GeH_4 and SnH_4

C. Formic acid forms dimer by H-bonding

D. All the above are correct statements

Answer: D

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53. Hydrogen

A. is placed in 1 since it forms monovalent cation H^+

B. is placed in halogen family since it forms monovalent anion H^-

C. is placed in carbon family since both have a half filled shell of electrons

D. follows all of the above facts

Answer: D

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54. Bond angles $H-O-H$ and $H-O-O-$ in water and hydrogen peroxide repectively are

A. 104.5° in both

B. 94.8° in both

C. $104.5^\circ, 94.8^\circ$

D. 94.8° and 104.5°

Answer: C

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55. Nascent hydrogen is formed in...

$I: Zn + dil.\ HCl \quad II. : CH_3OH + Na$

$III:$ Electrolysis of H_2O $IV.$: Silent electric discharge of H_2O_2

A. I, II

B. II, III

C. I, II, III

D. IV

Answer: A

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56. Out of the following metals which will give H_2 on reaction with $NaOH$

$I: Zn \quad II: Mg \quad III: AI \quad IV: Be$

A. I, II, III, IV

B. I, III, IV

C. II,IV

D. I, III.

Answer: B

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57. Under what conditions of temperature and pressure the formation of atomic hydrogen from molecular hydrogen will be favoured most?

A. high temperature and high pressure

B. low temperature and low pressure

C. high temperature and low pressure

D. low temperature and high pressure

Answer: C

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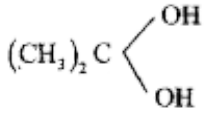
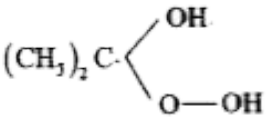
58. H_2O_2 can also be obtained by the partial oxidation of 2-propanol. $(CH_3)_2CHOH + O_2 \xrightarrow[\text{pressure}]{\text{little}H_2O_2 + O_2} (CH_3)_2CO + H_2O_2$. Intermediate in this reaction is

A. 

B. $(CH_3)_3C^+$

C. 

D. none of the above

Answer: C

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59. Consider following statements :

$I: AlH_3 + H^- \rightarrow AlH_4^-$ $\quad$ $II: H_2O + H^- \rightarrow H_2 + OH^-$

Select correct statements based on these reactions.

A. H^- is a Lewis acid in I and Lewis base in II

B. H^- is a Lewis base in I and Bronsted base in II

C. H^- is a Lewis acid in I and Bronsted acid in II

D. H^- isa Lewis base in I and II

Answer: B

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60. The hydride ion H^- is a stronger base than hydroxide ion, which of the following reactions will occur sodium hydride (NaH) is dissolved in water?

A. $2H + (aq) \rightarrow H_2 + 2e^-$

B. $H^-(aq) + H_2O(l) \rightarrow OH^- + H_2$

C. $H^- + H_2O(l) \rightarrow \text{No reaction}$

D. None of the above

Answer: B

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61. The correct decreasing order of basic strength is

A. $AsH_3 > SbH_3 < PH_3 < NH_3$

B. $SbH_3 > AsH_3 > PH_3 > NH_3$

C. $NH_3 > PH_3 > AsH_3 > SbH_3$

D. $PH_3 > AsH_3 > SbH_3 > NH_3$

Answer: C

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62. Zinc gives H_2 gas with H_2SO_4, and $conc.\ HCl$ but not with conc. HNO_3, because:

A. Zn acts as an oxidising agent when reacts with HNO_3

B. HNO_3 is weaker acid than H_2SO_4 and HCI

C. in electrochemical series Zn is above hydrogen

D. NO_3^- is reduced in preference to hydronium ion

Answer: D

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63. Mass of one atom is $6.66 \times 10^{-23} g$. Its percentage in a hydride is 95.24. Thus, hydride is

A. MH

B. MH_2

C. MH_3

D. MH_4

Answer: B

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64. Select incorrect statement.

A. Ortho and para hydrogen are different due to difference in their nuclear spins

B. Ortho and para hydrogen are different due to difference in their electron spins

C. Parahydrogen has a lower internal energy than that of ortho hydrogen

D. Para hydrogen is more stable at lower temperature

Answer: B

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65. Select correct statement(s).

A. H_2O_2 reduces MnO_4^- to Mn^{2+} in acidic medium

B. H_2O_2 reduces MnO_4^- to MnO_2 in basic medium

C. H_2O_2 can be used to bleach blackened oil paintings

D. All the above are.correct statement

Answer: D

Watch Video Solution

66. 10 mL of H_2O_2, solution on treatment with KI and titration of liberated I_2, required 10 mL of 1 N hypo. Thus H_2O_2 is

A. 1 N

B. 5.6 volume.

C. $17gL^{-1}$

D. all are correct

Answer: D

Watch Video Solution

67. An inorganic substance liberates oxygen on heating and turns an acidic solution of KI brown and reduces acidified $KMnO_4$ solution. The substance is:

A. HgO

B. H_2O_2

C. KNO_3

D. $Pb(NO_3)_2$

Answer: B

Watch Video Solution

68. In which of the following reactions does hydrogen act as an oxidising agent?

A. $H_2 + F_2 \rightarrow$

B. $H_2 + SiCl_4 \rightarrow$

C. $Na + H_2 \rightarrow$

D. $CuO + H_2 \rightarrow$

Answer: C

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69. When H_2O_2 is added to ice cold solution of acidified potassium dichromate in ether and the contents are shaken and allowed to stand :

A. a blue colour is obtained in ether due to formation of $Cr_2(SO_4)_3$

B. a blue colour is obtained in ether due to formation of CrO_5

C. a blue colour is obtained in ether due to formation of CrO_3

D. chromyl chloride is formed

Answer: B

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70. 2g of aluminium is treated separately with excess of dil. H_2SO_4 and excess of NaOH, the ratio of volume of hydrogen evolved is :

A. $2:3$

B. $1:1$

C. $2:1$

D. $1:2$

Answer: B

Watch Video Solution

71. In which reaction, hydrogen peroxide neither acts as an oxidising agent nor as a reducing agent?

A. $PbS + H_2O_2 \rightarrow$

B. $SO_3^- + H_2O_2 \rightarrow$

C. $PbO_2 + H_2O_2 \rightarrow$

D. $Na_2CO_3 + H_2O_2 \rightarrow$

Answer: D

Watch Video Solution

72. Which one of the following reactions does not form gaseous product?

A. $PbO_2 + H_2O_2 \rightarrow$

B. $PbS + H_2O_2 \rightarrow$

C. $Cl_2 + H_2O_2 \rightarrow$

D. $Na_2CO_3 + H_2O_2 \rightarrow$

Answer: B

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Level Ii Assertion Reason Type Questions

1. Assertion : The water gas shift reaction can be used to increase the amount of H_2 in the 'syn gas' mixture.

Reason : In this reaction, water is reduced to H_2 by CO (I) If both assertion and reason are correct and reason is the correct explanation of assertion. (II) Both assertion and reason are correct but reason is not the correct explanation of assertion (III) If assertion is correct and reason is not correct (IV) Assertion is wrong and reason is correct

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

Watch Video Solution

2. Assertion : Calgon is used in the manufacture of soft water used for laundry purpose

Reason : Ca^{2+} and Mg^{2+} ions present in hardwater are rendered ineffective by calgon forming their soluble complexes. (I) If both assertion and reason are correct and reason is the correct explanation of assertion. (II) Both assertion and reason are correct but reason is not the correct explanation of assertion (III) If assertion is correct and reason is not correct (IV) Assertion is wrong and reason is correct

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

Watch Video Solution

3. Assertion : Heavy water is widely used as moderator in nuclear reactors. Reason : It slows down the fast moving neutrons and thus helps in controlling the nuclear reactions.

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

Watch Video Solution

4. Assertion : Hydrogen combines with other elements by losing, gaining or sharing electrons.

Reason : Hydrogen forms electrovalent and covalent bonds with other elements.

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

Watch Video Solution

5. Assertion : Alkali metal amalgam is usually used to prepare hydrogen from dilute acids.

Reason : Reaction of alkali metals with dilute acids is highly exothermic and easily catch fire.

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

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Questions

1. Calculate the concentration in g/litre of "20 volume" solution of hydrogen peroxide.

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2. Calculate the strength in gL^{-1}, molarity and normality of 30 volume perhydrol.

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3. A certain sample of hydrogen peroxide is 2.5 M solution. It is to be labelled as X volumes. Calculate the value of X.

Watch Video Solution

4. What mass of hydrogen peroxide is present in 2.5 litre solution of 5 M strength? Calculate the volume of oxygen at STP liberated upon complete decomposition of $500cm^3$ of the above solution.

Watch Video Solution

Level I

1. Water softening by Clarke's process uses which of the following

A. Calcium bicarbonate

B. Sodium bicarbonate

C. Potash alum

D. Calcium hydroxide

Answer: D

Watch Video Solution

2. Hydrogen peroxide is reduced by

A. Ozone

B. Barium peroxide

C. Acidic solution of KM_nO_4

D. Lead sulphide suspension

Answer: D

Watch Video Solution

3. Hydrogen peroxide is prepared in the laboratory by

A. Adding MnO_2 , to dil. H_2SO_4

B. Passing CO_2 into BaO_2

C. Adding Na_2O_2 to cold water

D. Adding PbO_2 to $KMnO_4$

Answer: B

Watch Video Solution

4. The degree of hardness of water is usually expressed in terms of

A. ppm by weight of $MgSO_4$

B. g/L of $CaCO_3$ and $MgCO_3$ present

C. ppm by weight of $CaCO_3$ irrespective of whether it is actually present

D. ppm of $CaCO_3$ actually present is water

Answer: C

Watch Video Solution

5. Semi-water gas is a mixture of

A. $CO + H_2$

B. $CO + N_2$

C. $CO + H_2 + N_2$

D. $H_2 + CH_4$

Answer: C

Watch Video Solution

6. The boiling point of water is high because

A. water molecule is linear

B. water molecule is not linear

C. water molecules possess covalent bond between H and O

D. water molecules associate due to H-bonding

Answer: D

Watch Video Solution

7. Which of the following hydrides is electron precise hydride?

A. B_2H_6

B. NH_3

C. HF

D. CH_4

Answer: D

Watch Video Solution

8. Which one of the following processes will produce hard water?

A. Saturation of water with $CaCO_3$

B. Saturation of water with $MgCO_3$

C. Saturation of water with $CaSO_4$

D. Addition of Na_2SO_4, to water

Answer: C

Watch Video Solution

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

A. Reaction of methane with steam.

B. Mixing natural hydrocarbons of high molecular weight

C. Electrolysis of water.

D. Reaction of salt like hydrides with water.

Answer: C

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10. Which physical property of dihydrogen is wrong?

A. Colourless gas

B. Odourless gas

C. Tasteless gas

D. Non-inflammable gas

Answer: D

Watch Video Solution

11. The conversion of atomic hydrogen into ordinary hydrogen is

A. exothermic change

B. endothermic change

C. nuclear change

D. photochemical change

Answer: A

Watch Video Solution

12. Of the following statements regarding dihydrogen, identify the statement which is not correct?

A. It is a colourless, odouriess, tasteless gas

B. It has very low solubility in water

C. It forms more compounds than any other element

D. It is a highly reactive gas.

Answer: D

Watch Video Solution

13. The correct order of the thermal stability of hydrogen halides (H-X) is

A. $HI > HBr > HCI > HF$

B. $HF > HCI > HBr > HI$

C. $HCI < HF > HBr < HI$

D. $HI > HCI < HF > HBr$

Answer: B

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14. Electron-deficient, electron-precise and electron-rich hydrides are types of

A. ionic hydrides

B. interstitial hydrides

C. covalent hydrides

D. metallic hydrides

Answer: C

Watch Video Solution

15. Which of the following elements form metallic hydrides?

A. A They generally form non-stoichiometric species

B. B The hydrogen dissolved in titanium improves its mechanical properties

C. C They give rise to metals fit for fabrication

D. D On thermal decomposition, they afford a source of pure hydrogen

Answer: A

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16. Which of the following has the highest extent of hydrogen bonding?

A) NH3, B)H2O c)HF

A. NH_3

B. H_2O

C. HF

D. Same in all

Answer: B

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17. Which of the following hydrides is used for the storage of hydrogen and serve as a source of energy?

A. Ionic hydride

B. Covalent hydride

C. Metallic hydride

D. Polymeric hydride

Answer: C

Watch Video Solution

18. The pk_w° of water

A. increases with increase in temperature

B. decreases with increase in temperature

C. increases upto $4^\circ C$ followed by decrease

D. remains constant with change in temperature

Answer: B

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19. Which of the following has lower value for D_2O than for H_2O?

A. Molecular mass

B. Boiling point

C. Viscosity.

D. Ionization constant

Answer: D

Watch Video Solution

20. When hard water is passed through permutit, which ions are exchanged with Ca_2 and Mg^{2+}?

A. Na^+

B. $Al^3 +$

C. H^+

D. K^+

Answer: A

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21. Hydrogen peroxide acts both as an oxidizing and as a reducing agent depending upon the nature of the reacting species. In which of the

following cases H_2O_2 acts as a reducing agent in acid medium?

A. MnO_4^-

B. $Cr_2O_7^{2-}$

C. SO_3^{2-}

D. KI

Answer: A

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22. From the following statements regarding H_2O_2 choose the incorrect statement.

A. A. It decomposes on exposure to light

B. B. It has to be stored in plastic or wax lined glass bottles in dark

C. C. It'has to be kept away from dust

D. D. It can act only as an oxidizing agent

Answer: D

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23. The $O-O-H$ bond angle in H_2O_2 in the gas phase is

A. 106°

B. $109^\circ 28'$

C. 120°

D. 94.8°

Answer: D

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24. The bleaching property of hydrogen peroxide is due to its

A. acidic nature

B. ability to liberate nascent oxygen

C. reducing nature

D. ability to liberate nascent hydrogen

Answer: B

Watch Video Solution

25. Calgon used as a water softener is

A. $Na_2\left[Na_4(PO_3)_6\right]$

B. $Na_4\left[Na_2(PO_3)_6\right]$

C. $Na_2\left[Na_4(PO_4)_5\right]$

D. $Na_4\left[Na_4(PO_4)_6\right]$

Answer: A

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26. Hydrogen has the tendency to gain one electron to acquire helium configuration. In this respect, it resembles

A. alkali metals

B. carbon

C. alkaline earth metals

D. halogens

Answer: D

Watch Video Solution

27. Ortho-Hydrogen and para-hydrogen resemble in which of the following property?

A. Themal conductivity

B. Magnetic properties

C. Chemical properties

D. Heat capacity

Answer: C

Watch Video Solution

28. The bond angle and dipole moment of water, respectively, are

A. 109.5°, $1.84D$

B. 107.5°, $1.56D$

C. 104.5°, $1.84D$

D. 102.5°, $1.56D$

Answer: C

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29. Which of the following produces hydrolith with dihydrogen?

A. Mg

B. Al

C. Cu

D. Ca

Answer: D

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30. H_2O_2 is always stored in black bottles because

A. it is highly unstable

B. its enthalpy of decomposition is high

C. it undergoes auto-oxidation on prolonged standing

D. Both A&C

Answer: D

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31. Hydrides of elements of Groups 3–5 are generally called

A. interstitial hydrides

B. ionic hydrides

C. polymeric hydrides

D. complex hydrides

Answer: A

Watch Video Solution

32. Decomposition of H_2O_2 is prevented by

A. N_aOH

B. MnO_2

C. acetanilide

D. oxalic acid

Answer: C

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33. In which of the following compounds does hydrogen exhibit a negative oxidation state:

A. LiH

B. H_2O

C. HCI

D. $NaOH$

Answer: A

Watch Video Solution

34. When water is dropped over sodium peroxide, the colourless gas produced is

A. dinitrogen

B. dioxygen

C. dihydrogen

D. hydrogen peroxide

Answer: B

Watch Video Solution

35. What is false about Lane's process?

A. Method is used for manufacture of dihydrogen

B. It involves the oxidation of iron by steam

C. It involves the reduction of H_2O_g by iron

D. It involves the oxidation of water gas

Answer: D

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36. The volume of 10 volume H_2O_2 required to liberate 500 mL of O_2 at STP is

A. 25mL

B. 50mL

C. 100mL

D. 125mL

Answer: B

Watch Video Solution

37. On burning hydrogen in air the colour of flame is

A. green

B. light bluish

C. yellow

D. red

Answer: B

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38. When electric current is passed through an ionic hydride in molten state :

A. hydrogen is liberated at anode

B. hydrogen is liberated at cathode

C. hydride ion migrates towards cathode

D. hydride ion remains in solution

Answer: A

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39. Among CaH_2, NaH, NH_3, and B_2H_6 which are covalent hydrides?

A. NH_3 and B_2H_6

B. NaH, and CaH_2

C. NaH, and NH_3

D. CaH_2 and B_2H_6

Answer: A

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40. Both temporary and permanent hardness is removed on boiling with

A. $Ca(OH)_2$

B. Na_2CO_3

C. $CaCO_3$

D. CaO

Answer: B

Watch Video Solution

41. The mass per cent of H_2O_2 in '30 volume H_2O_2 is

A. $4.56\ \%$

B. $9.11\ \%$

C. $11.39\ \%$

D. $13.67\ \%$

Answer: B

Watch Video Solution

42. Hard water is not fit for washing clothes because

A. it contains Na_2SO_4 and KCl

B. it gives precipitate with soap

C. it contains impurities

D. it is acidic in nature

Answer: B

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43. The combination of hydrogen and carbon monoxide in the presence of the catalyst ZnO and Cu gives

A. $C + H_2O$

B. $CH_4 + H_2O$

C. $HCHO$

D. CH_3OH

Answer: D

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44. Which of the following orders of boiling points of hydrides of Group 16 is correct?

A. $H_2O > H_2Se > H_2S$

B. $H_2O > H_2S < H_2Se$

C. $H_2O < H_2S > H_2Se$

D. $H_2O < H_2S < H_2Se$

Answer: B

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45. Which of the following statements regarding water is not correct?

A. High dielectric constant and strong solvating power make water an excellent solvent

B. Water expands on freezing

C. The density of water is maximum at $4^{\circ} C$

D. On cooling, density of water decreases upto 4°C followed by increase up to$4^{\circ} C$

Answer: D

Watch Video Solution

Level Ii Assertion Reason Type

1. Assertion : Beryllium hydride is a covalent hydride.

Reason : The electronegativity difference between Be and H is very high.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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2. Assertion : H_2O_2 has higher boiling point than water.

Reason : The dipole moment of H_2O_2 is little more than that of water.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

Watch Video Solution

3. Assertion : Permanent hardness of water is removed by treatment with washing soda.

Reason : Washing soda reacts with soluble magnesium and calcium sulphate to form insoluble carbonates.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

4. Assertion : The colour of old lead paintings can be restored by washing with a dilute solution of H_2O_2.

Reason : Hydrogen peroxide oxidises black lead sulphide to white lead sulphate.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

5. Assertion : The water gas shift reaction can be used to increase the amount H_2 in the syngas mixture.

Reason : In this reaction, CO reduces steam to H_2.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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6. Assertion : Chlorine reacts more rapidly with H_2 than with D_2.

Reason : D-Cl bond is stronger than H-Cl bond.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

Watch Video Solution

7. Assertion : H_2O is the only hydride of group 16 which is a liquid at ordinary temperature.

Reason : In ice, each oxygen atom is surrounded by two covalent bonds and two hydrogen bonds.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

Watch Video Solution

8. Assertion. : NaCl is less soluble in heavy water than in ordinary water.

Reason : Dielectric constant of ordinary water is more than that of heavy water.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

9. Assertion : Decomposition of H_2O_2 is 'a disproportionation reaction.

Reason : H_2O_2 molecule simultaneously undergoes oxidation and reduction reactions.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

10. Assertion : On adding zinc pieces to aqueous $FeCl_3$ solution, colour changes from deep yellow to light green.

Reason : Aqueous $FeCl_3$ is acidic and on adding zinc, nascent hydrogen is produced which reduces deep yellow $FeCl_3$ solution to light green $FeCl_2$ solution.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

11. Assertion : Calgon is used for removing Ca^{2+} and Mg^{2+} ions.

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

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

Watch Video Solution

12. Assertion : All the three isotopes of hydrogen have almost the same chemical properties.

Reason : Isotopes differ from one another in respect of the presence of neutrons.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

Watch Video Solution

13. Assertion : Hydrides of N, O and F have lower boiling points than the hydrides of their subsequent group members.

Reason : Boiling point depends upon the molecular mass only.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

Watch Video Solution

14. Assertion : Melting and boiling points of D_2O are higher than those of ordinary H_2O.

Reason : D_2O has lesser degree of association and lower molecular mass than H_2O.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

Watch Video Solution

15. Assertion : A 30% solution of H2O2 is marked as '100 volume' hydrogen peroxide.

Reason : 1 Lof 30% H_2O_2, will give 100 mL of oxygen at STP.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

Watch Video Solution

16. Assertion : Temporary hardness can be removed by boiling.

Reason : On boiling the soluble bicarbonates change to carbonates which being insolubie, get precipitated.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

17. Assertion : Hydrogen combines with other elements by losing, gaining or sharing of electrons.

Reason : Hydrogen forms electrovalent and covalent bonds with other elements.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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18. Assertion : In alkaline solution, H_2O_2 reacts with potassium ferricyanide.

Reason : H_2O_2 is a strong reducing agent.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

19. Assertion : The process of adsorption of hydrogen on palladium is known as occlusion.

Reason : The adsorbed hydrogen is more active than ordinary hydrogen.

A. If both (A) and (R) are correct and (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

Watch Video Solution

Level I

1. Water softening by Clarke's process uses which of the following

A. Calcium bicarbonate

B. Sodium bicarbonate

C. Potash alum

D. Calcium hydroxide

Answer: D

Watch Video Solution

2. Hydrogen peroxide is reduced by

A. Ozone

B. Barium peroxide

C. Acidic solution of $KMnO_4$

D. Lead sulphide suspension

Answer: D

Watch Video Solution

3. Hydrogen peroxide is prepared in the laboratory by

A. Adding MnO_2, to dil H_2, SO_4

B. Passing CO_2,into BaO_2

C. Adding Na_2, O_2 to cold water

D. Adding PhO_2 to $KMnO_4$

Answer: B

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4. The degree of hardness of water is usually expressed in terms of

A. ppm by weight of $MgSO_4$

B. g/L of $CaCO_3$, and $MgCO_3$, present

C. ppm by weight of $CaCO_3$, irrespective of whether it is actually present

D. ppm of $CaCO_3$, actually present is water

Answer: C

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5. Semi-water gas is a mixture of

A. $CO + H_2$

B. $CO + N_2$

C. $CO + H_2 + N_2$

D. $H_2 + CH_4$

Answer: C

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6. The boiling point of water is high because

A. water molecule is linear

B. water molecule is not linear

C. water molecules possess covalent bond between Hand O

D. water molecules associate due to H-bonding

Answer: D

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7. Which of the following hydrides is electron precise hydride?

A. B_2H_6

B. NH_3

C. HF

D. CH_4

Answer: D

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8. Which one of the following processes will produce hard water?

A. Saturation of water with $CaCO_3$

B. Saturation of water with $MgCO_3$

C. Saturation of water with $CaSO_4$

D. Addition of Na_2SO_4 to water

Answer: C

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

A. Reaction of methane with steam

B. Mixing natural hydrocarbons of high molecular weight.

C. Electrolysis of water.

D. Reaction of salt like hydrides with water.

Answer: C

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10. Which physical property of dihydrogen is wrong?

A. Colourless gas

B. Odourless gas

C. Tasteless gas

D. Non-inflammable gas

Answer: D

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11. The conversion of atomic hydrogen into ordinary hydrogen is

A. exothermic change

B. endothermic change

C. nuclear change

D. photochemical change

Answer: A

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12. Of the following statements regarding dihydrogen, identify the statement which is not correct?

A. It is a colourless, odourless, tasteless gas

B. It has very low solubility in water

C. It forms more compounds than any other element

D. It is a highly reactive gas.

Answer: D

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13. The correct order of the thermal stability of hydrogen halides (H-X) is

A. $HI > HBr > HCI > HF$

B. $HF > HCI > HBr > HI$

C. $HCI < HF > HBr < HI$

D. $HI > HCI < HF > HBr$

Answer: B

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14. Electron-deficient, electron-precise and electron-rich hydrides are types of

A. ionic hydrides

B. interstitial hydrides

C. covalent hydrides

D. metallic hydrides

Answer: C

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15. Which of the properties of interstitial hydrides is correct?

A. They generally for non-stoichiometric species

B. The hydrogen dissolved in titanium improves its mechanical properties

C. They give rise to metals fit for fabrication

D. On thermal decomposition, they afford a source of pure hydrogen

Answer: A

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16. Which of the following has the highest extent of hydrogen bonding?

A) NH3, B)H2O c)HF

A. NH_3

B. H_2O

C. HF

D. Same in all

Answer: B

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17. Which of the following hydrides is used for the storage of hydrogen and serve as a source of energy?

A. Ionic hydride

B. Covalent hydride

C. Metallic hydride

D. Polymeric hydride

Answer: C

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18. The pk_w° of water

A. increases with increase in temperature

B. decreases with increase in temperature

C. increases upto 4° C followed by decrease

D. remains constant with change in temperature

Answer: B

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19. Which of the following has lower value for D_2O than for H_2O?

A. Molecular mass

B. Boiling point

C. Viscosity

D. Ionization constant

Answer: D

Watch Video Solution

20. When hard water is passed through permutit, which ions are exchanged with Ca_2 and Mg^{2+}?

A. Na^+

B. AI^{3+}

C. H^+

D. K^+

Answer: A

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21. Hydrogen peroxide acts both as an oxidizing and as a reducing agent depending upon the nature of the reacting species. In which of the following cases H_2O_2 acts as a reducing agent in acid medium?

A. MnO_4^-

B. $Cr_2O_7^{2-}$

C. SO_3^{2-}

D. KI

Answer: A

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22. From the following statements regarding H_2O_2 choose the incorrect statement.

A. It decomposes on exposure to light

B. It has to be stored in plastic or wax lined glass bottles in dark

C. It has to be kept away from dust

D. It can act only as an oxidizing agent

Answer: D

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23. The $O-O-H$ bond angle in H_2O_2 in the gas phase is

A. 106°

B. $109^\circ 28$

C. 120°

D. 94.8°

Answer: D

Watch Video Solution

24. The bleaching property of hydrogen peroxide is due to its

A. acidic nature

B. ability to liberate nascent oxygen

C. reducing nature

D. ability to liberate nascent hydrogen

Answer: B

Watch Video Solution

25. Calgon used as a water softener is

A. $Na_2\left[Na_4, (PO_3)_6\right].$

B. $Na_4, \left[Na_2, (PO_3)_6\right]$

C. $Na_2, \left[Na_4(PO_4)_5\right]$

D. $Na_4, [Na_4, (PO_4)_6]$

Answer: A

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26. Hydrogen has the tendency to gain one electron to acquire helium configuration. In this respect, it resembles

A. alkali metals

B. carbon

C. alkaline earth metals

D. halogens

Answer: D

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27. Ortho-Hydrogen and para-hydrogen resemble in which of the following property?

A. Themal conductivity

B. Magnetic properties

C. Chemical properties

D. Heat capacity

Answer: C

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28. The bond angle and dipole moment of water, respectively, are

A. 109.5°, $1.84D$

B. 107.5°, $1.56D$

C. 104.5°, $1.84D$

D. 102.5°, $1.56D$

Answer: C

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29. Which of the following produces hydrolith with dihydrogen?

A. Mg

B. Al

C. Cu

D. Ca

Answer: D

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30. H_2O_2 is always stored in black bottles because

A. it is highly unstable

B. its enthalpy of decomposition is high

C. it undergoes auto-oxidation on prolonged standing

D. Both A&C

Answer: D

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31. Hydrides of elements of Groups 3–5 are generally called

A. interstitial hydrides

B. ionic hydrides

C. polymeric hydrides

D. complex hydrides

Answer: A

Watch Video Solution

32. Decomposition of H_2O_2 is prevented by

A. NaOH

B. MnO_2

C. acetanilide

D. oxalic acid

Answer: C

Watch Video Solution

33. In which of the following compounds does hydrogen exhibit a negative oxidation state:

A. LiH

B. H_2O

C. HCl

D. NaOH

Answer: A

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34. When water is dropped over sodium peroxide, the colourless gas produced is

A. dinitrogen

B. dioxygen

C. dihydrogen

D. hydrogen peroxide

Answer: B

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35. What is false about Lane's process?

A. Method is used for manufacture of dihydrogen

B. It involves the oxidation of iron by steam

C. It involves the reduction of H_2, $O_{(g)}$ by iron

D. It involves the oxidation of water gas

Answer: D

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36. The volume of 10 volume H_2O_2 required to liberate 500 mL of O_2 at STP is

A. 25 mL

B. 50 mL

C. 100 mL

D. 125 mL

Answer: B

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37. On burning hydrogen in air the colour of flame is

A. green

B. light bluish

C. yellow

D. red

Answer: B

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38. When electric current is passed through an ionic hydride in molten state :

A. hydrogen is liberated at anode

B. hydrogen is liberated at cathode

C. hydride ion migrates towards cathode

D. hydride ion remains in solution

Answer: A

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39. Among CaH_2, NaH, NH_3, and B_2H_6 which are covalent hydrides?

A. NH_3, and B_2, H_6

B. NaH and CaH_2

C. NaH and NH_2

D. CaI_2, and B_2, H_6

Answer: A

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40. Both temporary and permanent hardness is removed on boiling with

A. $Ca(OH)_2$,

B. Na_2CO_3

C. $CaCO_3$

D. CaO

Answer: B

Watch Video Solution

41. The mass per cent of H_2O_2 in '30 volume H_2O_2 is

A. 0.0456

B. 0.0911

C. 0.1139

D. 0.1367

Answer: B

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42. Hard water is not fit for washing clothes because

A. it contains Na_2, SO_4, and KCI

B. it gives precipitate with soap

C. it contains impurities

D. it is acidic in nature

Answer: B

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43. The combination of hydrogen and carbon monoxide in the presence of the catalyst ZnO and Cu gives

A. $C + H_2O$

B. $CH_4 + H_2O$

C. HCHO

D. CH_3OH

Answer: D

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44. Which of the following orders of boiling points of hydrides of Group 16 is correct?

A. $H_2O > H_2, S > H_2, Se$

B. $H_2, O > H_2, S < H_2Se$

C. $H_2O < H_2S > H_2Se$

D. $H_2O < H_2S < H_2Se$

Answer: B

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45. Which of the following statements regarding water is not correct?

A. High dielectric constant and strong solvating power make water an excellent solvent

B. Water expands on freezing

C. The density of water is maximum at 4°C

D. On cooling, density of water decreases upto 4°C followed by increase up to 0°C

Answer: D

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Level Ii

1. Which one of the following statements is not correct for ortho and para hydrogen?

A. They have different boiling points

B. Ortho form is more stable than the para form

C. They differ in the spin of their protons

D. The ratio of ortho to para hydrogen increases with increase in temperature and finally pure ortho form is obtained

Answer: D

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2. If 10 cm^3 solution of H_2O_2 on decomposition gives 150 cm^3 of O_2 at STP, then volume strength of H_2O_2 is

A. 15

B. 30

C. 20

D. 10

Answer: A

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3. Which of the following is not correct for D_2O?

A. Boiling point is higher than H_2O

B. D_2O reacts slowly than H_2O

C. Viscosity is higher than H_2O at $25^\circ C$

D. Solubility of NaCl in D_2, O is more than H_2, O

Answer: D

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4. Why does H^+ ion always get associated with other atoms or molecules?

A. Ionisation enthalpy of hydrogen resembles that of alkali metals

B. Its reactivity is similar to halogens

C. It resembles both alkali metals and halogens

D. 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

Answer: D

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5. Metallic hydrides are useful for hydrogen storage because

A. they reacts with hydrogen and form stable compound

B. they absorb H-atoms

C. they adsorb H-atoms

D. they form unstable compounds

Answer: C

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6. Which of the following is not true?

A. D_2O, freezes at lower temperature than H_2, O

B. Reaction between H_2 and Cl_2, is much faster than D_2 and CI_2

C. Ordinary water electrolysed more rapidly than D_2,O

D. Bond dissociation energy of D_2, is greater than H_2

Answer: A

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7. The increasing order of reducing property of NaH, MgH_2 and H_2O is

A. $NaH < H_2O < MgH_2$

B. $MgH_2 < H_2O < NaH$

C. $H_2O < MgH_2 < NaH$

D. $NaH < MgH_2 < H_2O$

Answer: C

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8. In context with the industrial preparation of hydrogen from water gas $(CO + H_2)$, which of the following is the correct statement? : CO and H_2 are fractionally separated using differences in their densities. , CO is removed by absorption in aqueous Cu_2Cl_2 solution. , H_2 is removed through occlusion with Pd. , CO is oxidized to CO_2 with steam in the presence of a catalyst followed by absorption of CO_2 in alkali.

A. CO and H_2, are fractionally separated using differences in their densities.

B. CO is removed by absorption in aqueous Cu_2, Cl_2, solution.

C. H_2, is removed through occlusion with Pd.

D. CO is oxidized to CO_2, with steam in the presence of a catalyst followed by absorption of CO_2, in alkali

Answer: D

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9. An element that does not form stable hydride is

A. Co

B. Ca

C. Li

D. Na

Answer: A

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

A. CaO

B. $Ca(OH)_2$

C. $CaCO_3$

D. $Ca(HCO_3)_2$

Answer: B

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11. In which of the following rections H_2O_2 is not an oxidising agent?

A. (i) (ii)

B. (iii) (iv)

C. (i) (iii)

D. (ii) (iv)

Answer: D

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12. Find the percentage strength of H_2O_2 in a sample marked "10 volumes."

A. 0.03

B. $0.5\ \%$

C. $0.1\ \%$

D. $0.15\ \%$

Answer: A

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13. Hydrogen molecule differs from chlorine molecule in the following respect:

A. Hydrogen moleculeis non-polar but chlorine molecule is polar

B. Hydrogen molecule is polar while chlorine molecule is non-polar

C. Hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not

D. Hydrogen molecule cannot participate in coordination bond formation but chlorine molecule can

Answer: D

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14. High dipole moment of water justifies that

A. it is not linear molecule

B. it is a universal solvent

C. it has higher densitythan ice

D. it is neutral toward litmus

Answer: A

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15. Which of the following is correct about heavy water?

A. Water at 4° C having maximum density is known as heavy water

B. It is heavier than water

C. It is formed by the combination of heavier isotope of hydrogen and oxygen

D. Both B and C

Answer: D

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16. The atom of oxygen lost by H_2O_2 molecule during oxidation reaction is that which is linked through

A. an electrovalent bond

B. a covalent bond

C. a coordinate bond

D. a hydrogen bond

Answer: B

Watch Video Solution

17. In which of the following reactions does dihydrogen act as an oxidising agent?

A. $Ca + H_2 \rightarrow CaH_2$

B. $2H_2 + O_2 \rightarrow 2H_2O$

C. $H_2 + F_2 \rightarrow 2HF$

D. $CuO + H_2 \rightarrow Cu + H_2O$

Answer: A

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18. The melting points of most of the solid substances increase with an increase of pressure acting on them. However, ice melts at a temperature lower than its usual melting point when the pressure is increased. This is because:

A. ice is less dense than water

B. it generates heat

C. chemical bonds break under pressure

D. none

Answer: A

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19. When 50%solution of H_2SO_4 is electrolysed by passing a current of high density at low temperature the main products of electrolysis are:

A. oxygen and hydrogen

B. H_2, and peroxo disulphuric acid

C. H_2, and SO_2

D. O_2, and peroxy disulphuric acid

Answer: B

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20. $100mL$of $0.01MKMnO_4$ oxidises $100mLH_2O$, in acidic medium. Volume of the same $KMnO_4$ required in alkaline medium to oxidise 100

mL of the same H_2O_2 will be (MnO_4^- changes to Mn^{2+} in acidic medium and to MnO_2 in alkaline medium)

A. $\frac{100}{3}$mL

B. $\frac{500}{3}$mL

C. $\frac{300}{5}$ mL

D. $\frac{100}{5}$ mL

Answer: B

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21. 10mL of H_2O_2 solution (volume strength=x) requires-10 mL of $N/0.56MnO_4^-$ solution in acidic medium. Hence x is

A. 0.56

B. 5.6

C. 0.1

D. 10

Answer: D

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22. 10L of hard water required 0.56 goflime (CaO) for removing hardness. Hence, temporary hardness in ppm (part per million, 10%) of $CaCO_3$ is

A. 100

B. 200

C. 10

D. 20

Answer: A

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23. Match List- I with List-II and select the correct answer using the codes given below in 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 wa

A. I-C,2-D, 3-B, 4-A

B. I-B,2-A, 3-C, 4-D

C. I-B,2-D, 3-C, 4-A

D. I-A,2-A, 3-B, 4-D

Answer: D

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24. Consider LiH, MgH_2 and CuH:

A. all are ionic hydrides

B. LiH , MgH_2 are ionic whereas CuH is

C. LiH MgH_2 are ionic whereas CuH is metallic

D. LiH is is ionic MgH_2 is covalent and and CuH is metallic

Answer: D

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25. Which statements is/are correct?

A. Boiling point of H_2, O, NH_3, , HF are maximum in their respective group due to intermolecular H-bonding

B. Boiling point of CH_4, out of CH_4, SiH_4,, GeH_4, and SnH_4

C. Formic acid forns dimer by H-bonding

D. All the above are correct statements

Answer: D

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26. Hydrogen

A. is placed in 1 since it foms monovalent cation H^+

B. is placed in halogen family since it forms monovalent anion H^-

C. is placed in carbon family since both have a halffilled shell of electrons

D. follows all of the above facts

Answer: D

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27. Bond angles $H-O-H$ and $H-O-O-$ in water and hydrogen peroxide repectively are

A. 104.5° in both

B. 94.8° in both

C. $104.5^\circ, 94.8^\circ$

D. 94.8° and 104.5°

Answer: C

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28. Nascent hydrogen is formed in...

$I: Zn + dil.\ HCl \quad II. : CH_3OH + Na$

$III:$ Electrolysis of H_2O $IV.$: Silent electric discharge of H_2O_2

A. I,II

B. II, III

C. I, II, III, IV

D. IV

Answer: A

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29. Out of the following metals which will give H_2 on reaction with $NaOH$

$I: Zn \quad II: Mg \quad III: AI \quad IV: Be$

A. I,II, III, IV

B. I, III, IV

C. II, IV

D. I, III

Answer: B

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30. Under what conditions of temperature and pressure the formation of atomic hydrogen from molecular hydrogen will be favoured most?

A. high temperature and high pressure

B. low temperature and low pressure

C. high temperature and low pressure

D. low temperature and high pressure

Answer: C

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31. H_2, O_2, can also be obtained by the partial oxidation of 2-propanol $(CH_3)_2CHOH + O_2 \xrightarrow[\text{presure}]{\text{little}H_2O_2 + O_2} (CH_3)_2CO + H_2O_2$. Intermediate in this reaction is

A. 

B. $(CH_3)_3C^+$

C. 

D. None of these

Answer: C

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32. Consider following statements :

$I: AlH_3 + H^- \rightarrow AlH_4^-$ $\quad$ $II: H_2O + H^- \rightarrow H_2 + OH^-$

Select correct statements based on these reactions.

A. H^- is a Lewis acid in I and Lewis base in II

B. H^- is a Lewis base in I and Bronsted base in II

C. H^+ is a Lewis acid in I and Bronsted acid in II

D. H^- is a Lewis base in I and II

Answer: B

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33. The hydride ion H^- is a stronger base than hydroxide ion, which of the following reactions will occur sodium hydride (NaH) is dissolved in water?

A. $2H^+(aq) \rightarrow H_2 + 2e^-$

B. $H^-(aq) + H_2O(I) \rightarrow OH^- + H_2$

C. $H^- + H_2O(I) \rightarrow$ Noreaction

D. None of these

Answer: B

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34. The correct decreasing order of basic strength is

A. $AsH_3, > SbH_3, > PH_3, > NH_3$

B. $SbH_3 > AsH_3 > PH_3 > NH_3$

C. $NH_3 > PH_3 > AsH_3 > SbH_3$

D. $PH_3 > AsH_3 > SbH_3 > NH_3$

Answer: C

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35. Zinc gives H_2 gas with H_2SO_4, and $conc.\ HCl$ but not with conc. HNO_3, because:

A. Zn acts as an oxidising agent when reacts with HNO_3

B. HNO_3, is weaker acid than H_2, SO_4, and HCI

C. in electrochemical series Zn is above hydrogen

D. NO_3^-, is reduced in preference to hydronium ion

Answer: D

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36. Mass of one atom is $6.66 \times 10^{-23} g$. Its percentage in a hydride is 95.24. Thus, hydride is

A. MH

B. MH_2

C. MH_3

D. MH_4

Answer: B

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37. Select incorrect statement.

A. Ortho and para hydrogen are different due to difference in their nuclear spins

B. Orths and para hydrogen are different due to difference in their electron spins

C. Parahydrogen has a lower internal energy than that of ortho hydrogen

D. Para hydrogen is more stable at lower temperature

Answer: B

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38. Select correct statement(s).

A. H_2, O_2, reduces MnO_4^-, to Mn^{2+} in acidic medium

B. H_2, O_2, reduces MnO_2 to MnO, in basic medium

C. H_2, O_2, can be used to bleach blackened oil paintings

D. All the above are correct statement

Answer: D

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39. 10 mL of H_2O_2, solution on treatment with KI and titration of liberated I_2, required 10 mL of 1 N hypo. Thus H_2O_2 is

A. 1 N

B. 5.6 volume

C. $17gL^{-1}$

D. all are correct

Answer: D

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40. An inorganic substance liberates oxygen on heating and turns an acidic solution of KI brown and reduces acidified $KMnO_4$ solution. The substance is:

A. HgO

B. H_2O_2

C. KNO_3

D. $Pb(NO_3)_2$

Answer: B

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41. In which of the following reactions does hydrogen act as an oxidising agent?

A. $H_2 + Fe \rightarrow$

B. $H_2SiCI_4 \rightarrow$

C. $Na + H_2 \rightarrow$

D. $CuO + H_2 \rightarrow$

Answer: C

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42. When H_2O_2 is added to ice cold solution of acidified potassium dichromate in ether and the contents are shaken and allowed to stand :

A. a blue colour is obtained in ether due to formation of $Cr_2, (SO_4)_3$

B. a blue colour is obtained in ether due to formation of CrO_5

C. a blue colour is obtained in ether due to formation of CrO_3

D. chromyl chloride is formed

Answer: B

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43. 2g of aluminium is treated separately with excess of dil. H_2SO_4 and excess of NaOH, the ratio of volume of hydrogen evolved is :

A. $2:3$

B. $1:1$

C. $2:1$

D. $1:2$

Answer: B

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44. In which reaction, hydrogen peroxide neither acts as an oxidising agent nor as a reducing agent?

A. $PbS + H_2O_2 \rightarrow$

B. $SO_3^- + H_2O_2 \rightarrow$

C. $PbO_2 + H_2O_2 \rightarrow$

D. $Na_2CO_3 + H_2O_2 \rightarrow$

Answer: D

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45. Which one of the following reactions does not form gaseous product?

A. $PbO_2 + H_2O_2 \rightarrow$

B. $PbS + H_2O_2 \rightarrow$

C. $CI_2 + H_2O_2 \rightarrow$

D. $Na_2CO_3 + H_2O_2 \rightarrow$

Answer: B

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Level Iii Single Correct Answer Type

1. Which of the following statements regarding water is not correct?

A. Water acts as an acid in the presence of a base stronger than itself

B. Water acts as a base in the presence of an acid stronger than itself

C. Water is reduced to dihydrogen by metals having standard reduction potential less than-0.41 V

D. Water is energetically less stable than hydrogen and oxygen taken separately

Answer: D

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2. Which of the following is/are the preparation or manufacture of H_2O_2

1) Mercks's process 2) Thenard's process

3) Electrolysis of 50% of H_2SO_4 4) Auto-oxidation of 2-alkyl anthraquinol

5) Oxidation of isopropyl alcohol

A. $2Fe(CN)_6^{4-} + 2H^+ + H_2O_2 \rightarrow 2Fe(CN)_6^{3-} + 2H_2O$

B. $O_3 + H_2O_2 \rightarrow 2O_2 + H_2O$

C. $Mn^{2+} + H_2O_2 \rightarrow Mn^{4+} + 2OH^-$

D. $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

Answer: B

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3. Consider the reaction

(i) $H_2O_2 + O_3 \rightarrow 2H_2O + 2O_2$ (ii) $PbS + 4O_3 \rightarrow PbSO_4 + 4O_2$

A. O_3, is reduced both in (i) and (ii)

B. O_3, is oxidized both in (i) and (ii)

C. O_3 is oxidized in (i) and reduced in (ii)

D. O_3, is reduced in (1) and oxidized in (ii)

Answer: A

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4. 100 mL of ozone at STP was passed through 100 mL of 10 volume H_2O_2 , solution. What is the volume strength of H_2O_2, after the reaction?

A. 9.5

B. 9.0

C. 4.75

D. 4.5

Answer: A

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5. Consider the following statements:

I. Atomic hydrogen is obtained by passing hydrogen through an electric arc.

II. Hydrogen gas will not reduce heated aluminium oxide.

III. Finely divided palladium absorbs large volume of hydrogen gas

IV. Pure nascent hydrogen is best obtained by reacting Na with C_2, H_5, OH.

Which of the above statements is/are correct?

A. I alone

B. II alone

C. I, II and III

D. II, III and IV

Answer: C

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Level Iii Multiple Correct Answer Type

1. Which of the following statements are correct in the case of heavy water?

A. Heavy water is used as a moderator in nuclear reactor

B. Heavy water is used as a tracer for studying reaction mechanisms

C. Heavy water has lower boiling point than ordinary water

D. Enthalpy of vaporisation of heavy water is more than that of ordinary water

Answer: A::B::D

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2. In which of the following compounds does hydrogen exhibit a negative oxidation state:

A. HCl

B. NaH

C. CaH_2

D. HI

Answer: B::C

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3. An oxide which give H_2O_2 on treatment with dilute acid is

A. PbO_2

B. MnO_2

C. Na_2O_2

D. BaO_2

Answer: C::D

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4. Which is not true about saline hydrides

A. They are binary compounds of hydrogen and metallic elements

B. They are crystalline solids

C. They are generally very soft

D. Their common examples are, SiH_4, CH_4, etc.

Answer: A::B

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5. Which of the following statements are correct

A. H_2, O_2, reduces MnO_4^-, both in acidic and basic media

B. H_2, O_2, oxidises Fe^{2+} ions both in acidic and basic media

C. H_2, O_2, oxidises Mn^{2+} to Mn^{4+} ions in basic medium

D. H_2, O_2 liberates I, from acidified KI solution and reduces I_2, to l^- ions in basic medium

Answer: A::B::C::D

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6. Hydrogen bonding plays a central role in the following phenomena.

A. Ice floats in water.

B. Higher Lewis basicity of primary amines than tertiary amines in aqueous solutions

C. Formic acid is more acidic than acetic acid.

D. Dimerization of acetic acid in benzene.

Answer: A::B::D

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7. Which of the following processes can be used for preparation of H_2, gas

A. Dissolving LiH in water.

B. Reaction of Al with NaOH solution.

C. Reaction of Zn with dilute H_2SO_4

D. Electrolysis of H_2O in the presence of KOH.

Answer: A::B::C::D

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8. Which of the following elements form metallic hydrides?

A. Cu

B. Pd

C. Li

D. Sc

Answer: A::B::D

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9. Which of the properties of water given below is/are false?Water is a universal solvent." Hydrogen bonding is present to a large extent in liquid water. There is no hydrogen bonding in the frozen state of water. Frozen water is heavier than liquid water.

A. Water is a universal solvent."

B. Hydrogen bonding is present to a large extent in liquid water.

C. There is no hydrogen bonding in the frozen state of water.

D. Frozen water is heavier than liquid water.

Answer: C::D

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10. Temporary hardness of water can be removed by which of the following processes?

A. Lime-soda process

B. Boiling

C. Clark's process

D. Ion exchange method

Answer: A::B::C

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11. Pick out the correct statement(s).

A. Natural hard water is toxic in nature

B. Natural hard water does not produce lather with soap

C. Water containing some potash alum is hard water

D. Water obtained by zeolite process is not pure water

Answer: B::C::D

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12. When zeolite, which is hydrated sodium aluminium silicate, is treated with hard water, the sodium ions are exchanged with H + ions C a 2 + ions S 2 − 4 ions M g 2 + ions

A. H^+ ions

B. Ca^{2+} ions

C. S_4^{2-} ions

D. Mg^{2+} ions

Answer: B::D

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13. Which of the following properties of hydrogen are similar to those of halogens ?

A. Formation of H^+ like X^+

B. Formation of H^- like X^-

C. Formation of H_2 like X_2

D. None of these

Answer: B::C

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14. Which of the following statements are incorrect for H_2O_2,?

A. Pure H_2O_2 , is fairly stable

B. It sometimes acts as a reducing agent

C. It acts as an oxidizing agent

D. Aqueous solution of H_2O_2, is weakly basic

Answer: A::B::C

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15. Which of the following statements is correct regarding the conversion of metal into metallic hydride?

A. The density of metallic hydride is less than that of parent metal.

B. The crystal lattice expands through the inclusion of hydride.

C. A solid piece of a metal tums into powdered hydride

D. None of these

Answer: A::B::C

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Level Iii Numerical Type

1. Commercial sample of H_2O_2, is labelled as 10 V. Its % strength is nearly

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2. The number of electron-rich hydrides among the following is .....

$CH_4, NH_3, PH_3, H_2O, H_2S, BH_3, , HF, AlH_3, AsH_{,3}$

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3. The mass number of the element obtained when tritium undergoes β-decay is.....

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4. Maximum number of hydrogen bonding in H_2,O is.....

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5. The sum of protons, electrons and neutrons in the heaviest isotope of hydrogen is

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6. The number of protons that can be accepted by hydrazine is ..

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7. A bottle of H_2O_2, is labelled as 10 vol H_2O_2. 112 mL of this solution of H_2O_2, is titrated against 0.04 M acidified solution of $KMnO_4$, Calculate the volume of $KMnO_4$, in terms of litre.

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8. Washing soda $(Na_2CO_3.10H_2, O)$ is widely used in softening of hard water. If 1 L of hard water requires 0.0143 g of washing soda, what is

hardness of water in terms of ppm of $CaCO_3$,?

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9. How many moles of phosphine are produced when one mole of calcium phosphide reacts with water?

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10. What is the molarity of a commercial sample of 33.6 volume hydrogen peroxide solution?

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Level Iii Matching Column Type

1.

Column I	Column II
A. Nascent hydrogen	p. Permutit
B Hard water	q. Used as tracer in the study of reaction mechanis
C Hydrogen peroxide	r. Reduces $FeCl_3$ to $FeCI_2$
DHeavy water	s. Reduces $Cr_2O_7^{2-}$ to Cr^{3+}

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2.

Column I	Column II
A. $NaBH_4$	p. Complex hydride
B. $LiBH_4$	q. Alanate
C. BeH_2	r. Ionic hydride
D. LiH	s. Covalent hydride

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3. Match the column 1 with column 2

Column I	Column II
A. Sodium ion in zeolite gets exchanged with	p. Ca^{2+}
B. Hardness	q. Mg^{2+}
C. Temporary hardness	r. $Ca(HCO_3)_2$
D. Permanent hardness	s. $MgSO^4$

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4. Match the metal hydrides with their properties.

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5. Match the compounds with type of hydrogen bond.

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6. Match the order of compounds with the property

View Text Solution

Level Iii Statement Type

1. Assertion : Permanent hardness of water is removed by treatment with washing soda.

Reason : Washing soda reacts with soluble magnesium and calcium sulphate to form insoluble carbonates.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: A

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2. Assertion : The colour of old lead paintings can be restored by washing with a dilute solution of H_2O_2.

Reason : Hydrogen peroxide oxidises black lead sulphide to white lead sulphate.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: A

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3. Assertion : The water gas shift reaction can be used to increase the amount H_2 in the syngas mixture.

Reason : In this reaction, CO reduces steam to H_2.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: A

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4. Assertion : H_2O is the only hydride of group 16 which is a liquid at ordinary temperature.

Reason : In ice, each oxygen atom is surrounded by two covalent bonds and two hydrogen bonds.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: B

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5. Assertion : On adding zinc pieces to aqueous $FeCl_3$ solution, colour changes from deep yellow to light green.

Reason : Aqueous $FeCl_3$ is acidic and on adding zinc, nascent hydrogen

is produced which reduces deep yellow $FeCl_3$ solution to light green $FeCl_2$ solution.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: A

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6. Assertion : Melting and boiling points of D_2O are higher than those of ordinary H_2O.

Reason : D_2O has lesser degree of association and lower molecular mass than H_2O.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: C

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Level Iii Linked Comprehension Type

1. The volume of 10 volume H_2O_2, solution that decolourises 200 ml of $2NKMnO_4$, solution in acidic medium is:

A. 112 mL

B. 336 ml

C. 200 ml

D. 224 ml

Answer: D

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2. 100 volume hydrogen peroxide solution means

A. 17.86 N

B. 30.36% H_2O_2

C. 8.93 M

D. all are correct

Answer: D

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3. H_2O_2, acts as an oxidising as well as a reducing agent both in acidic and basic media.

Which of the following substances on treatment with H_2O_2, gives MnO_2.

A. acidified $KMnO_4$

B. alkaline $KMnO_4$

C. alkaline $MnSO_4$

D. both (B) and (C)

Answer: D

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4. Hydrogen has three isotopes, protium, ${}_1^1H$, deuterium, ${}_1^2H$or Dand tritium, ${}_1^3H$ or T, which differ from one another in the number of neutrons. Naturally occuring hydrogen contains 99.986% of the ${}_1^1H$ isotope, 0.014% of ${}_1^2H$ and 7×10^{-16} % of ${}_1^3H$,so, the properties of hydrogen are essentially those of the lightest isotope. Protium is by far

the most abundant and tritium is radioactive and decays by Bemission. Their only difference in chemical properties are the rates of reactions and equilibrium constants.

Which of the following pairs shows maximum isotope effect?

A. ${}_{1}^{1}H$ and ${}_{1}^{2}D$

B. ${}_{17}^{35}CI$ and ${}_{17}^{37}CI$

C. ${}_{6}^{12}C$and ${}_{6}^{14}C$

D. None of these

Answer: A

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5. Hydrogen has three isotopes, protium, ${}_{1}^{1}H$, deuterium, ${}_{1}^{2}H$or Dand tritium, ${}_{1}^{3}H$ or T, which differ from one another in the number of neutrons. Naturally occuring hydrogen contains 99.986% of the ${}_{1}^{1}H$ isotope, 0.014% of ${}_{1}^{2}H$ and 7×10^{-16} % of ${}_{1}^{3}H$,so, the properties of hydrogen are essentially those of the lightest isotope. Protium is by far

the most abundant and tritium is radioactive and decays by Bemission. Their only difference in chemical properties are the rates of reactions and equilibrium constants.

Which of the following properties has incorrect order?

A. $H_2, < D_2, < T_2$: Boiling point order

B. $H_2, < D_2, < T_2$: Freezing point order

C. $H_2, < D_2, < T_2$: Latent heat of vapourization

D. $T_2O > H_2O, > D_2O$: Equilibrium constant for dissociation

Answer: D

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6. Hydrogen has three isotopes, protium, ${}_1^1H$, deuterium, ${}_1^2H$or Dand tritium, ${}_1^3H$ or T, which differ from one another in the number of neutrons. Naturally occuring hydrogen contains 99.986% of the ${}_1^1H$ isotope, 0.014% of ${}_1^2H$ and 7×10^{-16} % of ${}_1^3H$,so, the properties of hydrogen are essentially those of the lightest isotope. Protium is by far

the most abundant and tritium is radioactive and decays by Bemission. Their only difference in chemical properties are the rates of reactions and equilibrium constants.

The properties of hydrogen are essentially those of

A. ${}_{1}^{3}H$

B. ${}_{1}^{2}H$

C. ${}_{1}^{1}H$

D. None of these

Answer: C

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7. "Research scholar A added zinc pieces into aqueous $FeCl_3$, solution and performed some experiments with resultant solution." "Research scholar B passed H_2 gas into aqueous $FeCl_3$, solution and performed some experiments with resultant solution."

Yellow coloured $FeCl_3$, solution changed to light green (appeared as colourless) in the experiment of

A. A

B. B

C. both of these

D. none of these

Answer: A

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8. Research scholar A added zinc pieces into aqueous $FeCl_3$, solution and performed some experiments with resultant solution. "Research scholar B passed H_2S gas into aqueous $FeCl_3$, solution and performed some experiments with resultant solution."

Select correct statements

A. Zn pieces liberate nascent hydrogen on reaction with acidic solution of $FeCl_3$,

B. $FeCl_3$, solution is reduced to $FeCl_2$, in the experiments of A and B both

C. Blue colour complex is formed in both the experiments on reaction with $K_4\left[Fe(CN)_6\right)$

D. A deep blue colour is formed on reaction with KCNS in experiment B

Answer: A

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