CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 11 FOR CHEMISTRY

HYDROGEN & ITS COMPOUCDS

Example

1. One litre of a sample of hard water contains 1 mg of $CaCl_2$ and 1 mg of $MgCl_2$. Find the total hardness of water in terms of parts of $CaCO_3$ per 10^6 parts of water by mass.

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2. $25mL$ samples of distiled water, tap water and boiled water required, respectively, $1mL, 13mL$ and $5mL$ of soap solution to form a permanent lather. The ratio of temporary to permanent hardness in the tap water is

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3. Washing soda ($Na_2CO_{3.10}H_2O$) is widely used in softening of hard water. If $1L$ of hard water requires 0.0143g of washing soda, what is hardness of water in terms of ppm of $CaCO_3$?

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4. 100g of a water samples is found to contain 12 mg of $MgSO_4$ calculate the hardness of water sample.

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5. One litre of a sample of hard water contains 1 mg of $CaCl_2$ and 1 mg of $MgCl_2$. Find the total hardness of water in terms of parts of $CaCO_3$ per 10^6 parts of water by mass.

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6. When water is dropped over sodium peroxide, the colorless gas produced is

A. Di Nitrogen

B. Di Hydrogen

C. Di oxygen

D. H_2O_2

Answer: A

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7. Which of the following statements is incorrect for hydrogen peroxide ?

A. Ice cold 50% H_2SO_4.

B. Prolonged electrolysis of alkaline water

C. $K_2S_2O_8 + 2H_2O.$

D. $K_2S_2O_8 + 2D_2O$

Answer: C

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8. Lead pipes are not used for carrying drinking water because

A. They are covered with a coating of lead carbonate

B. They are carroded by air and moisture

C. Water containing dissolved air attacks lead forming soluble hydoxide.

D. All these are reasons

Answer: B

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9. xg of H_2O_2 requires $100mL$ of $M/5KMnO_4$ in a titration in a solution having $pOH = 1.0$ Which of the following is/are correct?

A. MnO_4^- changes to Mn_4^{-2}

B. Mn_4^{-2}

C. The value of x is $1.7g$.

D. The value of x is 0.34g.

Answer: D

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10. 100 " mL of " 0.01 M $KMnO_4$ oxidised 100 mL H_2O_2 in acidic medium. The volume of same $KMnO_4$ required in strong alkaline medium to oxidise 100 " mL of " same H_2O_2 will be:

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11. What is the strength in g per litre of a solution of $H_2SO_4, 12mL$ of which neutralized $15mL$ of $N/10NaOH$ solution?

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12. 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 $KMnO_4$ the volume of $KMnO_4$ in litre is

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13. $3.4g$ sample of H_2O_2 solution containing $x\ \%\ H_2O_2$ by weight requires $xmLofaKMnO_4$ solution for complete oxidation under acidic condition. The normality of $KMnO_4$ solution is

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14. If $100mL$ of acidified $2NH_2O_2$ is allowed to react with $KMnO_4$ solution till there is light tinge of purples colour, the volume of oxygen produced at STP is :

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C U Q Hydrogen

1. The lightest element in the periodic table is

A. Lithium

B. Fluorine

C. Hydrogen

D. Helium

Answer: B

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2. The element or elements whose position is anomalous the periodic table is

A. Hydrogen

B. Oxygen

C. Carbon

D. Nitrogen

Answer: D

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3. Write two similarities of hydrogen with alkali metals.

A. Natuer of oxide

B. Valence electrons

C. Electro negative natuer

D. Reducing character

Answer: C

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4. In which property listed below hydrogen does not resemble alkali metals ?

A. Tendency to form cation

B. Nature to oxide

C. Combination with halogens

D. Reducing character

Answer: B

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5. Hydrogen resembles halogens in many respects for which several factors are responsible. Of the following factors which one is most important in this respect ?

A. It contains one electron only in valency shell

B. It is short of one electron to get inert gas configuration

C. It is a diatomic gas like all halogens

D. It exhibits colro like halogens

Answer: D

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6. The hydrogen spectrum from an incandescent source of hydrogen is:

A. 1312KJ mole^{-1}

B. 520KJmole^{-1}

C. 495KJmol^{-1}

D. 1681KJmol^{-1}

Answer: D

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7. Coordination number of hydrogen in a hydrogen bond is

A. Greater then inert gases

B. Nearer to intert gases

C. Nearer to Halogens

D. Nearer to alkaline earth metals

Answer: C

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8. Which one of the following statement is incorrect

A. Hydrogen forms more compounds than any other element

B. H-has one electron short in comparison with octet configuration

C. The ionization enthalpy of H is 1312kJ/mol

D. Hydrogen is less reactive when compared with halogens

Answer: B

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9. Which one of the following statement is incorrect

A. Dihydrogen is the most abundant element in the universe.

B. Dihydrogen is the principal element in the solar atmosphere.

C. H_2 is much less abundant in the earth crust.

D. H_2 does not occur in plant and animal tissues

Answer: B

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10. Tritium is obtained by

A. a-particle

B. Positron

C. b-particle

D. Neutron

Answer: D

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11. Radioactive elements emit α, β and γ rays and are characterised by their half-lives. The radioactive isotope of hydrogen is

A. Protium

B. Tritium

C. Deuterium

D. Proton

Answer: B

12. The metal that cannot displace hydrogen from dil. HCl is

A. Al

B. Fe

C. Cu

D. Zn

Answer: D

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13. The conversion of atomic hydrogen into ordinary hydrogen is

A. Exothermic change

B. Endothermic change

C. Nuclear change

D. Photochemical change

Answer: B

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14. Which of the following reactions requires high temperature and catalyst ?

A. $H_2 + F_2 \rightarrow 2HF$

B. $H_2 + Cl_2 \rightarrow 2HCl$

C. $H_2 + Br_2 \rightarrow 2HBr$

D. $H_2 + I_2 \rightarrow 2HI$

Answer: D

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15. $CH \equiv CH + H_2O \xrightarrow{Hg^{+2}} CH_3CHO$

The reation is known as

A. Hydrogenation

B. Hydrofomylation

C. Carbonation

D. Decarboxylation

Answer: B

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16. Which of the following is used as rocket fuel?

A. $CO + O_2$

B. $F_2 + O_2$

C. $CH_4 + O_2$

D. liquid $H_2 + O_2$

Answer: D

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17. During hydrogenation of oils the catalyst commonly used is

A. Pd on CuCl_(2)

B. Fe

C. Ni

D. U_2O_5

Answer: C

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18. Synthetic petrol is prepared by using a mixture.

A. Coal gas + H_2gas

B. Water gas + H_2 gas

C. Semi water gas

D. Carburatted water gas

Answer: B

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19. Which of the following statements are correct regarding hydrogen? (i) The largest single use of dihydrogen is in the synthesis of NH_3 which is used in the manufacture of HNO_3 and nitrogenous fertilizers. (ii) It is used to reduce heavy metal oxide (iii) It is used as rocket fuel. (iv) Atomic hydrogen and oxy hydrogen torches find use for cutting and welded to purpose.

A. i,iii

B. i,ii

C. i,ii,iv

D. i,ii,iii,iv

Answer: D

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20. The temperature of _____ k is generated when atomic hydrogen is allowed to recombine on the surface to be welded.

A. 400K

B. 3000K

C. 4600K

D. 4000K

Answer: D

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21. Ionic hydrides are usually

A. NaH

B. CaH_2

C. LiH

D. BaH_2

Answer: C

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22. Which of the following exists as polymeric chain in the solid state?

A. CaH_2

B. CuH_2

C. BaH_2

D. SrH_2

Answer: B

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23. The hypothesis that all photosynthetic organic require a source of hydrogen was give by

A. NaH

B. CuH_2

C. LiH

D. BaH_2

Answer: B

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24. Di-hydrogen reduces CuO to

A. Cu_2O

B. CuH_2

C. (CuH_2)

D. Cu

Answer: D

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25. Which of the following hydride have significant covalent character :

A. LiH

B. BeH_2

C. MgH_2

D. All

Answer: B

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26. Which of the following statements are correct about ionic hydrides ?

(i) Crystalline, non-volatile, non-conducting in solid state

(ii) Their melts conduct electricity

(iii) Hydrogen is liberated at anode when their melt is electrolysed

(iv) LiH is less reactive at moderate temperature

A. i, iii

B. ii, iv

C. i, iii, iv

D. i, ii, iii, iv

Answer: D

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27. Law of constant composition doesnot hold good for

A. Saline hydrides

B. Interstitial Hydrides

C. Covalent Hydrides

D. Molecular Hydrides

Answer: B

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28. Which of the following is not correct about the hydrides of alkali metals ?

A. Ni

B. Pd

C. Ce, Ac

D. All

Answer: D

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29. How do you expect the metallic hydrides to be useful for hydrogen storage? Explain.

A. Pd, Pt

B. Na, Li

C. W, Mo

D. Fe, Ru

Answer: A

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30. Percentage of water present in oceans

A. 2.04

B. 6.2

C. 94.8

D. 97.3

Answer: D

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31. In ice, oxygen atom is surrounded-

A. Square planar

B. Tetrahedral

C. Trigonal planar

D. Angular

Answer: B

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32. H_2O acts as Bronsted acid in the following :

A. I only

B. I,II only

C. II,III only

D. I,II,III,

Answer: D

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33. (I)$CuSO_4 + 5H_2O \rightarrow CuSO_4.5H_2O$

(II) $PCl_3 + 3H_2O \rightarrow H_3PO_3 + 3HCl$

The processes I and II are respectively

A. Hydration and dehydration

B. Hydration and Hydrolysis

C. Hydrolysis and Hydrolysis

D. Hydration and hydration.

Answer: B

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34. The temporary hardness of water is due to the presence of

A. Chlorides of Ca and Mg

B. Sulphates of Ca and Mg

C. Bicarbonates of Ca and Mg

D. Carbonates of Ca and Mg

Answer: C

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35. The permanent hardness of water is due to the presence of

A. Sulphates and Chlorides of Ca and Mg

B. Carbonates of Ca and Mg

C. Bicarbonates of Ca and Mg

D. Phosphates of Ca and Mg

Answer: A

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36. Which of the following substances cause permanent hardness of water

A. $CaCl_2$

B. $Ca(HCO_3)_2$

C. $CaCO_3$

D. All of these

Answer: A

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37. Calgon (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. $Na_4\left[Na_2(PO_3)_3\right]$

D. $Na_2\left[Na_4(PO_3)_4\right]$

Answer: A

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38. The temporary hardness of water due to calcium bicarbonate can be removed by adding

A. $NaOH$

B. Na_2CO_3

C. $Ca(OH)_2$

D. $MgCl_2$

Answer: C

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39. The chemical formula of Zeolite is.....

A. $K_2Al_2Si_2O_8xH_2O$

B. $CaAl_2Si_2O_8$

C. $Na_2Al_2Si_2O_8xH_2O$

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

Answer: C

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40. When Zeolite (Hydrated sodium Alumininum silicate) is treated with hard water sodium ions are exchaged with ..... ions

A. H^+

B. Ca^+2

C. SO_4^{-2}

D. OH^-

Answer: B

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41. The formula of exhausted pemutit is

A. $CaAl_2Si_2O_8xH_2O$

B. $Na_2Al_2Si_2O_8xH_2O$

C. $CaB_2Si_2O_8xH_2O$

D. $K_2Al_2Si_2O_8xH_2O$

Answer: A

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42. Permanent hardness in water cannot be cured by :

A. Washing soda method

B. Permutit method

C. Ion exchange method

D. Boiling

Answer: D

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43. Exhausted cation exchange resin is regenerated by using solution of moderately concentrated.

A. $NaOH$

B. Na_2CO_3

C. H_2SO_4

D. Both 1& 2

Answer: D

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44. Exhausted anion exchange resin is resin by using solution of moderately concentrated.

A. $NaOH$

B. Na_2CO_3

C. H_2SO_4

D. $NaCl$

Answer: C

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45. De-ionized water is prepared by the following method :

A. Clark's

B. Ion exchange

C. Permutit

D. Calgon

Answer: B

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

A. $Ca(OH)_2$

B. Na_2CO_3

C. $NaCl$

D. $Mg(OH)_2$

Answer: B

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47. The composition of electrolyte for the manufacture of calcium by electrolytic method is

A. Can.H_2SO_4

B. Fused alkali

C. 50%H_2SO_4

D. 50% $aq.$ $NaOH$

Answer: C

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48. In the laboratory, H_2O_2 is prepared by the action of

A. 2-ethyl anthra quinone

B. 2-ethyl anthra quinol

C. p-benzo quinone

D. N-methyl anilne

Answer: B

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49. The action of H_2SO_4 on KI gives I_2 and H_2S Calculate the volume of $0.2MH_2SO_4$ to produce $3.4gH_2S$

A. $H_2S_2O_8$ at anode

B. H_2SO_4 at anode

C. H_2SO_5 at cathode

D. H_2O_2 at anode

Answer: A

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50. H_2O_2 is :

A. Solid Co_2 and ether

B. dil.H_2SO_4

C. Quick lime

D. $NaOH + CaO$

Answer: A

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51. What is the conc. Of H_2O_2 obtained by auto oxidation process?

A. $50\ \%$

B. $1\ \%$

C. $30\ \%$

D. $85\ \%$

Answer: B

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52. Write one chemical reactions for the preparation of D_2O_2.

A. $K_2S_2O_8$

B. $H_2S_2O_7$

C. H_2SO_4

D. H_2SO_5

Answer: A

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53. Which of the following does not form a stable hydrate on addition of H_2O ?

A. $H_2O_2.\ H_2O_2$

B. $H_2O_2.2H_2O$

C. $H_2O_2.3H_2O$

D. $H_2O_2.4H_2O$

Answer: A

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54. Perhydrol is

A. $10\ \%\ (w/v)H_2O_2$

B. $30\ \%\ (w/v)$ of H_2O_2

C. $3\ \%\ (w/v)H_2O_2$

D. $100\ \%\ (w/v)H_2O_2$

Answer: B

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55. Hydrogen peroxide has a:

A. Linear struchure

B. Closed chain structure

C. Closed book structure

D. Open book structure

Answer: D

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56. The dihedral angle in gaseous H_2O_2 is

A. 101.5°

B. 90°

C. 111.5°

D. $109^\circ 28^1$

Answer: C

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57. What is the dihedral angle between two H atoms of H_2O_2?

A. 100°

B. 90°

C. $109^\circ 28^1$

D. 180°

Answer: B

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58. In H_2O_2 molecule the O-O bond length is (in gas phase)

A. $1.34A^\circ$

B. $1.48A^\circ$

C. $1.54A^\circ$

D. $1.20A^\circ$

Answer: B

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59. H_2O_2 acts as an oxidising agent in

A. Acidic medium

B. In the presence of Glycerol

C. Alkaline medium

D. Neutral medium

Answer: A

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60. Bleaching action of H_2O_2 is due to its :

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

B. $H_2O_2 \rightarrow H_2O + (O)$

C. $H_2O_2 + (O) \rightarrow H_2O + O_2$

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

Answer: B

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61. When H_2O_2 is added to acidified ferrous sulphate solution

A. Electrons are gained by Fe^{2+}

B. Electrons are lost by Fe^{2+}

C. No loss (or) gain of electrons

D. Iron hydroxide is precipitated

Answer: B

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62. Which of the following is oxidized by H_2O_2 in the alkaline medium

A. HCHO

B. Mn(II)salts

C. Cr(III) salts

D. All of these

Answer: D

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63. When H_2O_2 acts as oxidizing agent, one of the end product is generally

A. O_2

B. H_2O

C. Both 1&2

D. O_3

Answer: B

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64. Which of the following is reduced by H_2I_2 in acid medium

A. $KMnO_4$

B. KI

C. $FeSO_4$

D. $K_4\left[Fe(CN)_6\right]$

Answer: A

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65. An aqueous solution of H_2O_2

A. Neutral

B. Strongly acidic

C. Weakly acidic

D. Weakly basic

Answer: C

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66. Which of the following statement is incorrect

A. H_2O_2 is an oxidising agent

B. H_2O_2 is a reducing agent

C. H_2O_2 is a bleaching agent

D. H_2O_2 is a dehydrating agent

Answer: D

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67. H_2O_2 Changes black lead sulphide to white

A. Pb

B. PbO_2

C. PbO

D. $PbSO_4$

Answer: D

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68. H_2O_2 changes aquesous KI solution to

A. HI

B. I_2

C. KI_3

D. H_2

Answer: B

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69. H_2O_2 acts as antiseptic due to its

A. Reducing property

B. Oxidizing property

C. Bleaching property

D. Acidic property

Answer: B

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70. Negative catalyest for the decomposition of H_2O_2 is

A. Silica

B. MnO_2

C. Alumina

D. Acetanilide

Answer: D

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71. Positive catalyst for the decomposition of H_2O_2 among the following is

A. Alcohol

B. Iron

C. Sodium-pyrophosphate

D. Urea

Answer: B

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72. Which compound is used for the manufacture of chemicals like sodium perborate and per-carbonate which are used in high quality detrgents.

A. H_2S

B. H_2O_2

C. D_2O

D. $NaOH$

Answer: B

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73. Which of the following is the use of H_2O_2 (i) hair bleach, disinfectant and antiseptic. (ii) In the synthesis of hydroquinone, paper pulp, (iii) Bleaching agent for textile, paper pulp, leather, oils, fats, etc. (iv) Treatment of domestic and industrial effluents.

A. i,iii

B. i,ii

C. ii,iv

D. i,ii,iii,iv

Answer: D

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74. The boiling point of D_2O is greater than H_2O_2 It is because

A. D_2O has lower Kw value

B. D_2O has a lower dielectric constant

C. D_2O is a associated liquid

D. Inter molecular H-bonds are stronger in D_2O than in H_2O_2

Answer: D

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75. The O-H bond energy in water when compared to O-D bond energy in heavy water is

A. Greater

B. Lesser

C. Equal

D. two times greater

Answer: B

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76. The physical constants which are less for D_2O than H_2O are

A. Freezing point and Boiling point

B. Density and viscosity

C. Solvating ability and dielectric constant

D. Temperature of maximum density

Answer: C

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77. Density of heavy water is maximum at

A. $3.82^{\circ} C$

B. $101.42^{\circ} C$

C. $11.6^{\circ} C$

D. $4^{\circ} C$

Answer: C

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78. The numbers of protons, electrons and neutrons in a molecule of heavy water are respectively

A. `_(1)H^(1),_(8)O^(16)

B. `_(1)H^(2),_(8)O^(18)

C. `_(1)H^(2),_(8)O^(16)

D. $_{(1)}H^{1},_{8}O^{18}$

Answer: C

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79. The boiling point of heavy water is

A. $3.82^\circ C$

B. $11.5^\circ C$

C. $100^\circ C$

D. $101.42^\circ C$

Answer: D

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80. In nuclear reactors heavy water is used as a

A. Fuel

B. Projectile

C. Moderator

D. Coolent

Answer: C

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81. $NaOH + D_2O \rightarrow NaOD + HDO$ is known as

A. Exchange reaction

B. Deuterolysis reaction

C. Hydrolysis reaction

D. Softening reaction

Answer: A

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82. When SO_3 is treated with D_2O, the products are :

A. D_2SO_4

B. D_2SO_3

C. $D_2\&H_2SO_4$

D. D_2SO_5

Answer: A

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83. What is formed when calcium carbide reacts with heavy water?

A. Acetylene

B. Calcium hydroxide

C. Deuterium

D. Deutero acetylene

Answer: D

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84. Same reasons are given reagarding the limited use of H_2 as fuel (I) Its calorific value is low (II) It availability in free state is less (III) It is difficult to store (IV) Its transportation is easy The correct statement are

A. I,II and III

B. II,III and IV

C. All are correct

D. II and III

Answer: D

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85. The correct statements among (a) to (d) regarding H_2 as a fuel are :

(a) It Produces less pollutants than petrol. (b) A cylinder if compressed dihydrogen weight ~30times more than a petrol tank producing the same amount

(c) Dihydrogen is stored in tanks of metal alloys like $NaNi_5$

(D) On combusion ,values of energy released per gram of liqiud dihydrogen and LPG are 50 and 142 kJ respectively

A. $NaNi_5$

B. $Ti - TiH_2$

C. $Mg - MgH_2$

D. All

Answer: D

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Level I C W

1. The most reactive isotope of H is

A. $_{}(1)H_1$

B. $_{}(1)H_2$

C. $_{}(1)H_3$

D. All have same reactivity

Answer: A

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2. \

A. Freezing point

B. Boiling point

C. Bond length

D. Bond energy

Answer: C

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3. H_2 gas is libreated at cathode and anode both by the electrolysis of the following aqueous solution except in

A. NaH

B. HCOONa

C. fused NaCl

D. LiH

Answer: C

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4. Which of the following reaction produces hydrogen ?

A. Mg+Steam

B. $BaO_2 + HCl$

C. $H_2S_4O_8 + H_2O$

D. $Na_2O_2 + 2HCl$

Answer: A

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5. Ionic hydrides react with water to

A. Basic solution

B. Acidic solution

C. Neutral solution

D. Hydride ion

Answer: A

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6. Inteestitial hydride is formed by

A. Be

B. Li

C. Cr

D. K

Answer: C

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7. Ionic hydrides are formed by :

A. Transition metals

B. Metalloids

C. Elements of high electropositivity

D. Elements of high electronegativity

Answer: C

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8. Temporary hardness of water is due the presence of

A. $CaCl_2$

B. $MgSO_2$

C. $Ca(HCO_3)_2$

D. All of these

Answer: D

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9. In Clark's method if $Ca(HO)_2$ is used for the removed of temporary hardness of water which is formed

A. NaOH

B. $CaCO_3$

C. $Ca(OH)_2$

D. $Ca(HCO_3)_2$

Answer: D

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10. During the electrolysis of 50% H_2SO_4, the p^H of the solution

A. Increases

B. Decreases

C. Becomes zero

D. Remains constant

Answer: A

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11. Why can dilute solutions of hydrogen peroxide not be concentrated by heating? How can a conentrated solution of hydrogen peroxide be obtanied ?

A. About 99% pure

B. About 90% pure

C. 30% pure

D. About 50%pure

Answer: B

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12. Hydrogen peroxide is

A. Diamagnetic

B. Paramagnetic

C. Ferromagnetic

D. Ferri magnetic

Answer: A

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13. The volume strength of $1 \cdot 5$ N H_2O_2 solution is

A. `8.4 Vol

B. 4.2 Vol

C. 16.8 Vol

D. 5.2 Vol

Answer: A

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14. Role of hydrogen peroxide iin the following reaction is respectively.

$(i) \quad H_2O_2 + O_3 \rightarrow H_2O + ZO_2$

$(ii) \quad H_2O_2 + Ag_2O \rightarrow Aag + H_2O + O_2$

A. Oxidizing agent

B. Mutual reduction

C. Reducing agent

D. Bleaching agent

Answer: B

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

A. H_2O_2

B. D_2O

C. KNO_3

D. $Pb(NO_3)_2$

Answer: A

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16. H_2O_2 acts as an oxidising agent in

A. Neutral medium

B. Acidic medium

C. Alkaline medium

D. Acidic and alkaline medium

Answer: D

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17. `H_(2)O_(2) converts potassium ferrocyanide to ferricyanide. The change observed in the oxidation state

of iron is

A. $Fe^{2+} \rightarrow Fe^{2+}$

B. $Fe \rightarrow Fe^{2+}$

C. $Fe^{3+} \rightarrow Fe^{2+}$

D. $Fe^{2+} \rightarrow Fe^{+}$

Answer: A

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18. The percentage to deuterium in heavy water is

A. 22.2

B. 11.2

C. 44

D. 20

Answer: D

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Level Ii C W

1. Which property is lower for deuterium than hydrogen?

A. Latent heat of vapourisation

B. Latent heat of fusion

C. Reactivity

D. Atomic weight

Answer: C

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2. The ratio of hydrogen, deuterium and tritium is

A. $3:2:1$

B. $1:2:3$

C. $3:6:1$

D. $6:2:1$

Answer: B

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3. Which combination cannot be used for the preparation of hydrogen gas in the laboratory ?

I. Zinc/conc. H_2SO_4

II. Zinc/ HNO_3

III. Pure zinc/dil. H_2SO_4

A. I and II

B. II and III

C. III only

D. I and III

Answer: B

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4. High purity dihydrogen is obtained by electrolysing

A. Electrolysis of pure water

B. Electroluysis of pure water

C. Action of Zn on NaOH

D. Eelctrolysis of acidulated water

Answer: B

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5. In aqueous solution, H_2 will not reduce :

A. Fe^{3+}

B. Cu^{2+}

C. Zn^{2+}

D. Ag^{+}

Answer: C

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6. Which one of the following statement is incorrect ?

A. H_2 reacts with Cl_2 to form HCl, an electron pair shared between H and Cl

B. Hydrogen is reduced by sodium to form NaH. An electron is tranferred from H to Na

C. Hydrogen reduces copper (II) oxide to cooper and itself gets oxidized to H_2O

D. Hydroformylation of olefins yields aldehyde which further undergoes reduction to give alcohol.

Answer: B

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7. What is the nature of aqueous solution of NaH

A. Acidic

B. Basic

C. Neutral

D. Amphoteric

Answer: B

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8. Water softened by permutitt process contains

A. Dissolved sodium salts

B. Dissolved gases

C. Does not give good lather with soap

D. Dissolved calcium salts

Answer: A

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

A. Baeyer

B. Calgon

C. Serpeck

D. Hoope

Answer: B

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10. The ion exchange resin which removes metal ions from hard water consists of giant organic molecule having

A. $-Clgroup$

B. $-COOHgroup$

C. $-OHgroup$

D. $-NH_2group$

Answer: B

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11. The volume strength of $1 \cdot 5$ N H_2O_2 solution is

A. $11.2V$

B. $22.4V$

C. $1V$

D. 5.6

Answer: D

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12. 3.4 gm of H_2O_2 decomposes, the weight of oxygen liberated from it is

A. 1.6 gm

B. 2.24 gm

C. 1.16 gm

D. 3.2 gm

Answer: A

View Text Solution

13. In which of the following reactions, H_2O_2 act as a reducing agent ?

A.

$$PbO_{2(s)} + H_2O_{2(aq)} \rightarrow PbO_{(s)} + H_2O_{(1)} + O_{2(g)}$$

B.

$$PbO_{2(s)} + H_2O_{2(aq)} \rightarrow PbO_{(s)} + H_2O_{(1)} + O_{2(g)}$$

C. $2KI_{(aq)} + H_2O_{2(aq)} \rightarrow 2KOH_{(aq)} + I_{2(s)}$

D. All the above

Answer: A

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14. How does H_2O_2 differ from O_3 in its chemical action?

A. In oxidising PbS to $PbSO_4$

B. In liberating I_2 from KI

C. In reducing acidified $KMnO_4$

D. In oxidising $K_4\left[Fe(CN)_6\right]$

Answer: C

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

A. Ionisation enthalpy of hydrogen resembles that of alkali metal

B. Its reactivity is similar to halogens

C. It resembles both alkli 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 connot exist free.

Answer: D

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16. Which of the following reaction increases, production of dihydrogen from synthesis gas ?

A. $CH_{4(g)} + H_2O_g \xrightarrow[Ni]{1270K} CO_g + 3H_{2(g)}$

B. $C_s + H_2O_g \xrightarrow{1270K} CO_g + H_{2(g)}$

C. $CO_g + H_2O_g \xrightarrow[catalyst]{673K} CO_{2(g)} + H_{2(g)}$

D. $C_2H_6 + 2H_2O \rightarrow \xrightarrow[Ni]{1270K} 2CO_g + 5H_{2(g)}$

Answer: C

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17. $CO + H_2 \xrightarrow[Cu]{ZnO}$ product. Identify the product formed in the given reaction.

A. CH_3COOH

B. CO_2

C. C_3O_2

D. CH_3OH

Answer: D

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Level Iii

1. Zn gives H_2 gas with H_2SO_4 and HCl but not with HNO_3 because

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

B. HNO_3 is weaker acid than H_2SO_4 and HCl

C. In electrochemical series Zn is above hydrogen

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

Answer: D

Watch Video Solution

2. Triple point of water is

A. $273.16K$

B. $373.15K$

C. $203.12K$

D. $193.16K$

Answer: A

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3. The correct statement regarding structure of ice :

A. Ice has a highly ordered three dimensional hydrogen bonded structure.

B. Each oxygen atom in ice is surrounded tetrahedrally by four other oxygen atoms at a distance of 276 pm.

C. Hydrogen bonding gives ice a rather open structure with wide holes. These holes can hold some other molecules of appropriate size interstitially.

D. All are correct.

Answer: D

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4. How many grams of barium hydride must be treated with water to obtain 4.36L of hydrogen at $20^{\circ}C$ and 0.975 atm pressure (Ba=137)?

A. $12.28g$

B. $24.56g$

C. $16.14g$

D. 14.56g`

Answer: A

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5. Limiting compositions of f-block hydrides are

A. $MH_2 \& MH_3$

B. $MH_3 \& MH_5$

C. $MH_2 \& MH_8$

D. $MH_2 \& MH_6$

Answer: A

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6. The volume of perhydrol which on decomposition gives 1.5 lit of O_2 gas at STP is

A. 25ml

B. 15ml

C. 10ml

D. 0ml

Answer: B

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7. Weight of H_2O_2 present in 560 ml. of 20 vol . H_2O_2 solution is approximately

A. 69g

B. 34g

C. 32g

D. 3.4g

Answer: B

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8. Which one of the following reactions does not correspond to the preparation of "synthetic gasoline" during the Fischer-Tropsch process?

A. $CO + 3H_2 \rightarrow CH_4 + H_2O_2$

B. $nCO + 2nH_2 \rightarrow nCH_3OH$

C. $nCO + 2nH_2 \rightarrow CnH_{2n} + nH_2O$

D. $nCO + (2n + 1)H_2 \rightarrow CnH_{2n+2} + nH_2O$

Answer: B

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9. In a reaction excess of H_2O_2 is added to 0.1 mole of acidified $KMnO_4$ solution. Then the S.T.P volume of O_2 liberated is

A. $5.6lit.$

B. $6.6lit.$

C. $11.2lit$

D. $22.4lit$

Answer: A

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10. $25mL$ of H_2O_2 solution were added to excess of acidified solution of KI. The iodine so liberated required $20mL$ of $0.1NNa_2S_2O_3$ for titration Calculate the strength of H_2O_2 in terms of normalility, percentage and volumes.

(b) To a $25mLH_2O_2$ solution, excess of acidified solution of KI was added. The iodine liberated required $20mL$ of $0.3N$ sodium thiosulphate solution. Calculate the volume strength of H_2O_2 solution.

A. $0.04N, 0.136\ \%$

B. $0.08N, 0.136\ \%$

C. $0.08N, 0.163\ \%$

D. $0.02N, 0.163\ \%$

Answer: B

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11. 20mL of H_2O_2 after acidification with dilute H_2SO_4 required 30mL of N/12 $KMnO_4$ for complete oxidation. Calculate the percentage of H_2O_2 in the solution. Equivalent mass of $H_2O_2 = 17$.

A. $10.75\frac{g}{l}it$

B. $11.75\frac{g}{l}it$

C. $12.75\frac{g}{l}it$

D. $13.75\frac{g}{l}it$

Answer: C

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12. In which of the following reactions, H_2O_2 act as a reducing agent ?

A. $PbS_{(s)} + 4H_4O_{2(aq)} \xrightarrow{H^+} PbSO_{4(s)} + H_2O(l)$

B. $HOCl + H_2O_2 \xrightarrow{H^+} H_3O^+ + Cl^{-1} + O_2$

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

D. $Fe^{2+} + H_2O_2 \xrightarrow{OH^-} 2Fe^{3+} + 2OH^-$

Answer: B

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13. Observe the following statement : (I) Heavy water is harmful for the growth of animals (II) Heavy water reacts with Al_4C_3 and forms deuterated acetylene (III) $BaCl_2.2D_2O$ is an example of interstitial deuterate

A. $1\&3$

B. $1\&2$

C. $1, 2, \&3$

D. $2\&3$

Answer: A

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14. What is (X) and (Y) in the above reaction?

A. $RCH_2CH_2CHO, RCH_2CH_2CH_2OH$

B. $RCH_2CH_2CHO, RCH_2CH_2OH$

C. CH_3CH_2CHO, CH_3CH_3OH

D. $CH_3CH_2CH_2CHO, CH_3CH_2CH_2OH$

Answer: A

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15. Metal hydrides are ionic, covalent or molecular in nature. Among LiH, NaH, KH, RbH, CsH the correct order of increasing ionic character is

A. $LiH > NaH > CsH > KH > RbH$

B. $LiH < NaH < KH < RbH < CsH$

C. $RbH > CsH > NaH > KH > LiH$

D. $NaH > CsH > RbH > LiH > KH$

Answer: B

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16. Study the following reaction carefully

I. $HOCl + H_2O_2 \rightarrow H_3O^+Cl^- + O_2$

II. $PbS + 4H_2O_2 \rightarrow PsSO_4 + 4H_2O$

Point out the correct option.

A. In (I), HOCl is sreduced and in (II) PbS is oxidesed

B. In (I), HOCl is oxidised and (II) PbS is reduced

C. In both (I) and (II), HOCl and PbS are reduced

D. In both (I) and (II), HOCl and PbS are oxidised

Answer: A

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17. How many grams of barium hydride must be treated with water to obtain 4.36L of hydrogen at $20^\circ C$ and 0.975 atm pressure (Ba=137)?

A. $24.56g$

B. $34.56g$

C. $42.65g$

D. $43.65g$

Answer: A

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Level Iv Ncert Based Questions Matching Type

1. 

A. A-IV,B-II,C-I,D-III

B. A-II,B-IV,C-I,D-III

C. A-IV,B-II,C-III,D-I

D. A-IV,B-I,C-II,D-III

Answer: D

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2. Match the following

A. $\begin{matrix} A & B & C & D \\ IV & II & III & I \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ III & I & II & IV \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ II & III & I & IV \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ I & II & III & IV \end{matrix}$

Answer: B

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

A. $\begin{matrix} A & B & C & D \\ I & II & IV & V \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ III & I & V & IV \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ III & II & I & V \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ I & IV & III & II \end{matrix}$

Answer: B

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

A. $\begin{matrix} A & B & C & D \\ IV & III & I & II \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ IV & III & I & II \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ IV & I & III & II \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ II & III & I & IV \end{matrix}$

Answer: D

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5. Match the following

A. $\begin{matrix} A & B & C & D \\ V & III & I & II \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ V & III & IV & I \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ IV & I & II & III \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ II & IV & V & I \end{matrix}$

Answer: C

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6. 

A. $\begin{matrix} A & B & C & D \\ I & III & IV & II \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ II & IV & III & I \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ II & III & I & IV \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ II & III & IV & I \end{matrix}$

Answer: D

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7. Match the following

A. $\begin{matrix} A & B & C & D \\ III & IV & II & I \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ II & III & I & IV \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ I & III & IV & II \end{matrix}$

D.
A	B	C	D
IV	II	III	I

Answer: A

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8. Match the following

A.
A	B	C
III	I	II

B.
A	B	C
I	II	III

C.
A	B	C
III	II	I

D.
A	B	C
II	I	III

Answer: A

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9.

A. $\begin{matrix} A & B & C & D \\ III & I & II & IV \end{matrix}$

B. 2 $\begin{matrix} A & B & C & D \\ III & I & II & V \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ II & I & III & V \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ IV & I & II & V \end{matrix}$

Answer: B

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10. The concentration of H_2O_2 in a solution containing 34g in 500ml is

The correct match is

A. $\begin{matrix} A & B & C & D \\ III & IV & I & II \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ IV & III & I & II \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ III & IV & I & II \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ I & II & III & IV \end{matrix}$

Answer: B

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11.

The correct match is

A. $\begin{matrix} A & B & C & D \\ I & III & IV & II \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ II & IV & III & I \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ IV & I & II & III \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ II & III & IV & I \end{matrix}$

Answer: C

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Level Iv Fill In The Blanks

1. The principal cause of hardness of water is the presence of____ and___ions.

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2. In reaction of hydrogen peroxide and sodium carbonate, H_2O_2 acts as___.

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3. In the reaction of F_2 and H_2O, water act as____.

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4. Sodium Zeolite is ___ .

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5. The trade name of soduim hexmetaphosphate is _____

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6. The electrolysis of molten hydrolith produces____gas at anode.

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7. Bleaching action of hydrogen peroxide is due to___.

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8. $O-O-H$ bond angle in H_2O_2 is approximately_____.

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9. Bleaching powder and hydrogen peroxide ract to give _____.

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10. Dropping of water over calcium carbide produces _____gas.

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11. The adsorption of hydrogen by palladium is commonly known as _____.

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12. Hydrogen gas is liberated the action of aluminium with concentrated solution of_____.

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Precious Jee Mains Adance

1. Polyphosphates are used as water softening agents because they

A. form solute complexes anionic species

B. precipitate anionic species

C. form soluble complexes with cationic species

D. precipitate cationic species

Answer: C

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2. The reagent commonly used to determine hardness of water titrimetrically is :

A. oxalic acid

B. disodium salt of EDTA

C. sodium citrate

D. sodium thiosulphate

Answer: B

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3. Among $CaH_2, NH_3,$ 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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4. The bond angle and dipole moment of water respectively are :

A. $109.5^\circ, 1.84D$

B. $107.5^\circ, 1.56D$

C. $104.5^\circ, 1.84D$

D. $102.5^\circ, 1.56D$

Answer: C

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5. In context with the industrial preparation of hydrogen from water gas $(CO + H_2)$. Which of the following is the correct statement?

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

B. CO and H_2 are fractionally separated using difference in their densities

C. CO is removed by absorption in aqueous Cu_2Cl_2

D. H_2 is removed through occlusion with Pd

Answer: A

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6. Hydrogen peroxide is now generally prepared on industrial scale by the

A. action of H_2SO_4 on barium peroxide

B. action of H_2SO_4 on sodium peroxide

C. electrolysis of 50% H_2SO_4

D. burning hydrogen in excess of oxygen

Answer: C

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7. When silicon is boiled with caustic soda solution, the gas evolved is

A. O_2

B. SiH_4

C. H_2

D. Both 1& 2

Answer: C

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8. Which will produce hard water ?

A. Saturation of water with $CaSO_4$

B. Addition of Na_2SO_4 to water

C. Saturation of water with $(CaCO_3)$

D. Saturation of water with $MgCO_3$

Answer: A

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9. Under what conditoin of temperature and pressur 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 high pressure

D. Low temperature and high pressuer

Answer: C

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10. Which of the following could act as a propellant for rockets ?

A. $Liq.\ H_2 + Liq.\ O_2$

B. $Liq.\ N_2 + Liq.\ O_2$

C. $Liq.\ H_2 + Liq.\ O_2$

D. $Liq.\ O_2 + Liq.\ Ar_2$

Answer: A

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11. Hydrogen is evolved the action of cold dilute HNO_3 on

:

A. Fe

B. Mg or Mn

C. Cu

D. All

Answer: B

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12. Metal which does not react with cold water but evolves H_2 with steam is :

A. Na

B. K

C. Pt

D. Fe

Answer: D

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13. Whichh 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 then water (H_2O)

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

D. None of the above

Answer: B

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14. When zeolite, which is hydrated sodium aluminium silicate, is treated with hard water, the sodium ions are are exchanged with

A. $H^+ ion$

B. $Ca^{2+} ion$

C. $SO_4^{2-} ion$

D. $OH^- ion$

Answer: B

Watch Video Solution

15. Ortho and para hydrogen have :

A. identical chemical properties but different physical properties

B. identical physical and chemical properties

C. identical physical propertiess but different chemical properties

D. different physical and cheimcal properties

Answer: A

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16. $CO + H_2 \xrightarrow[573K / 300atm]{X\,(\text{catalayst})} CH_3OH$, the catalyst X is :

A. Fe

B. Cr_2O_3 / ZnO

C. V_2O_5

D. Al_2O_3

Answer: B

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17. Which of the following undergoes reduction with H_2O_2 in an alkaline medium ?

A. Mn^{2+}

B. $HOCl$

C. PbS

D. Fe^{2+}

Answer: B

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18. In the reaction.

$$H_2S + H_2O_2 \rightarrow S + 2H_2O$$

A. H_2S is an acid and H_2O_2 is a base

B. H_2S is an base and H_2O_2 is a acid

C. H_2S is an oxidizing agent and H_2O_2 is a reaucing agent

D. H_2S is an reducing agent and H_2O_2 is an oxidizing agent

Answer: D

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19. Very pure hydrogen $(99.9\,\%)$ can be made by which of the following processes ?

A. Mixing natural hydrocarbons of high molecular weight

B. Electrolysis of water

C. Reaction of salt like hydrides with water

D. Reaction o methane with water

Answer: B

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20. In the reaction,

$$2FeSO_4 + H_2SO_4 + H_2O_2 \rightarrow Fe_2(SO_4)_3 + 2H_2O$$

The oxidising agent is

A. $FeSO_4$

B. H_2SO_4

C. H_2O_2

D. both $H_2SO_4$and H_2O_2

Answer: C

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21. The molecular formula of a commercial resin used for exchanging ions in water softening is $C_8H_7SO_3Na$ (Mol.wt.206). What would be the maximum uptake of Ca^{2+} ions by the resin when expressed in mole per gram resin?

A. $\frac{1}{103}$

B. $\frac{1}{206}$

C. $\frac{2}{309}$

D. $\frac{1}{412}$

Answer: D

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22. Heavy water is

A. H_2O^{18}

B. water obtained by repeated distillation

C. D_2O

D. water at $4^\circ C$

Answer: C

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

A. reducing agent, oxidising agent

B. reducing agent , reducing agent

C. ioxidising agent ,oxidising agent

D. oxidising agent , reducing agent

Answer: A

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24. Fe^{3+} is reduced to Fe^{3+} by sing

A. H_2O_2 in presence of $NaOH$

B. Na_2O_2 in water

C. H_2O_2 in presence of H_2SO_4

D. Na_2O_2 in presence of H_2SO_4

Answer: C::D

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25. A device that convers energy of combustion of fueles like hydrogen and methane, directly into electrical energy is known as .

A. Electrolytic cell

B. Dynamo

C. Ni-Cd cell

D. Fuel cell

Answer: C

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26. Permanent hardness in water cannot be cured by :

A. boiling

B. ion-exchange method

C. Calgon's method

D. treatment with washing soda

Answer: C

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27. From the following statements regarding H_2O_2, choose the incorrect statements:

A. It can act only as an oxidising agent

B. It decomposes on exposure to light

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

D. It has to be kept away from dust.

Answer: B

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

(A) $H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$

(B) $H_2O_2 - 2e^- \rightarrow O_2 + 2H^+$

(C). $H_2O_2 + 2e^- \rightarrow 2OH^-$

(D) $H_2O_2 + 2OH^- - 2e^- \rightarrow O_2 + 2H_2O$

A. I and II

B. III and IV

C. I and III

D. II and IV

Answer: B

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29. The reagent(s) used for softening the temporary hardness of water is (are):

A. $Ca,(PO_4),$

B. $Ca(OH)_2$

C. Na_2CO_3

D. $NaOCl$

Answer: B

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Level I H W

1. The total number of fundamental particles in tritium atom is

A. 4

B. 3

C. 2

D. 1

Answer: A

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2. $_{(1)}{}^{1}H,{}_{1}^{2}H$ and $_{(1)}{}^{3}H$ will have the same

A. Mass number

B. Chemical reactivity

C. Electron configuration

D. Nuclear radius

Answer: C

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3. Hydrogen does not combine with

A. Antimony

B. Sodium

C. Bismuth

D. Helium

Answer: D

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4. Which of the halogen has maximum affinity for hydrogen ?

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: A

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5. The electron deficient compound is

A. NH_3

B. PH_2

C. B_2H_6

D. C_2H_6

Answer: C

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6. IUPAC name of ammonia

A. Nitrogen hydride

B. Ammonia

C. Azane

D. Hydrazine

Answer: C

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7. The raw material used for preparing permutit is

A. Soda ash

B. Alumina

C. Silica

D. All the above

Answer: D

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8. Conpound obtained by passing CO_2 through BaO_2 in water is

A. CO

B. $Ba(OH)_2$

C. H_2O_2

D. O_2

Answer: C

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9. The volume of oxygen liberated from $15ml$ of 20 volume H_2O_2 is

A. $250ml$

B. $300ml$

C. $150ml$

D. $200ml$

Answer: B

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10. 20 volume H_2O_2 solution has a strength of about

A. $30\ \%$

B. $6\ \%$

C. $3\ \%$

D. $10\ \%$

Answer: B

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11. H_2O_2 will oxidise

A. $KMnO_4$

B. PbS

C. MnO_2

D. KCl

Answer: B

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12. Which subtance cannot be reduced by H_2O_2

A. $KMnO_4/H_2SO_4$

B. $KMnO_4/H_2SO_4$

C. Ag_2O

D. Fe^{3+}

Answer: D

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13. Deutero methane is obtained by the deuterolysis of

A. Mg_3N_2

B. CaC_2

C. AL_4C_3

D. Ca_3P_2

Answer: 3

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Level Ii

1. The most abundant and least abundant isotopes of hydrogen respectivley are

A. P,T

B. P,D

C. D,P

D. T,P

Answer: 1

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2. Which of the following statement are correct

I) Now -a days syngas is produced from sewage , saedust , scrap wood ,news paper etc. (II) The processs of proucing syngas from coal is called coal gassification .III) The producation of dihdration can be increased by the presence of iron chromate catalyst. IV) 77% of the industrial s=dihyrogen is propduced from perto chemicals

A. I,II

B. III,IV

C. I,III

D. I,II,III,Iv

Answer: 4

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3. the reaction related to coal gassification

A. $CO + H_2O \xrightarrow{Fe_2O_2 + Cr} CO_2 + H_2$

B. $C + H_2O \xrightarrow[\text{catalayst}]{673K} CO + H_2$

C. $CH_4 + H_2O \xrightarrow{Ni} CO + 3H_2$

D. $C_nH_{2n} + 2nH_2O \xrightarrow[Ni]{1270K} nCO + (2n+1)H_2$

Answer: 2

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4. The gas(es) used in the hydrogenation of oils in presence of nickel as a catalyst is/are:

A. Mrthane

B. Ethane

C. Ozone

D. Hygdroogen

Answer: 4

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5. Electromnn - defcienent hydroride is/are

A. BH_3

B. AlH_3

C. BeH_2

D. All

Answer: 4

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6. Which of the following pair of ions makes the water hard(temporary) ?

A. Na^+, SO_4^{-2}

B. Ca^{2+}, HCO_3^-

C. Ca^{2+}, Br^-

D. Nh_4^+, Cl^-

Answer: 2

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7. The pH of D_2O and H_2O at 298 K is

A. 7.0,7.0,

B. 7.35,7.0

C. 7.0,6.85

D. 6.85,7.35

Answer: 2

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8. $HNO_{3(aq)} + H_2O_{(l)} \rightarrow H_3O^+_{(aq)} + NO^-_{3(aq)}$

The above reaction is called as _____.

A. Acidic nature

B. Basicnature

C. Ionistaioin nature

D. Amphotericnature

Answer: 4

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9. 1 ml of H_2O_2 solution given 10 ml of O_2 at NTP. It is :

A. 10v

B. 25V

C. 50V

D. 100V

Answer: 3

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10. Hydrogen peroxide is a powerful oxidising agent, both in the acidic and alkaline medium.

In acidic medium: $H_2O_2 + 2H^{\oplus} + 2e^{\ominus} \rightarrow 2H_2O$

In alkaline medium: $H_2O_2 + 2e^{\ominus} \rightarrow 2\overset{\ominus}{O}H$

Hydrogen peroxide acts as a reducing agent towards powerful oxidising agents.

In acidic medium: $H_2O_2 \rightarrow 2H^{\oplus} + O_2 + 2e^{\ominus}$ In alkaline medium, however, its reducing nature is more effective.

$H_2O_2 \rightarrow 2H^{\oplus} + O_2 + 2e^{\ominus}$

In which of the following reactions, H_2O_2 acts as an oxidising agent?

A. HO_2^-

B. $HO_2\_(2)^{\oplus}$

C. O_2^{2-}

D. Both 1&3

Answer: 4

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11. 2g of aluminium is treated, separately with excess of dilute H_2SO_4, and excess of $NaOH$, the ratio of volumes of hydrogen evolved is

A. $3:2$

B. $1:1$

C. $1:2$

D. $2:1$

Answer: 2

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Level V

1. Hardness of water is $200ppm$. The normality and molarity of $CaCO_3$ in the water is

A. $4 \times 10^{-3}N, 2 \times 10^{-6}M$

B. $4 \times 10^{-3}N, 2 \times 10^{-6}N$

C. $4 \times 10^{-3}N, 2 \times 10^{-3}M$

D. $4 \times 10^{-3}N, 1 \times 10^{-3}M$

Answer: C

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2. A sample of hard water contains $122ppm$ of $HCO_3^{\ominus}$ ions,. What is the minimum weight of CaO required to remove ions completely from $1kg$ of such water sample?

A. 244mg

B. 168mg

C. 122mg

D. 56mg

Answer: C

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3. There are three samples of H_2O_2 labelled as $10vol, 15vol, 20vol$. Half liter of each sample are mixed and then diluted with equal volume of water. Calculate the volume strength of resultant solution.

A. 7.5

B. 1.339

C. 5.6

D. 15

Answer: A

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4. Which of the following water smple has maxiumum degree of hardness?

A. $9.5 g \text{of} MgCl_2 \text{in} 10^5 kg$ of water

B. $11.1 g \text{of} CaCl_2 \text{in} 10^5 kg \text{os water}$

C. $6.8 \text{of} CaSO_4 \text{in} 10^4 kg \text{of water}$

D. $1.2 g \text{of} MgSO_4 \text{in} 10^4 \text{of water}$

Answer: C

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5. The purity of H_2O_2 in a given sample is $85\ \%$. Calculate the weight of impure sample of H_2O_2 which requires

$10mL$ of $M/5KMnO_4$ solution in a titration in acidic medium

A. 2g

B. 0.2g

C. 0.17g

D. 0.15g

Answer: B

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6. 100mLOf top water containg $Ca(HCO_3)_2$was titrated with 30mL if HCl were required calculate the tempporrary harness as parts of $CaCO_3$ per 10^6 parts of water .

A. 300ppm

B. 150ppm

C. 100pm

D. 600ppm

Answer: A

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

A. $CaCO_3$

B. CaO

C. $Ca(OH)_2$

D. $Ca(HCO_3)_2$

Answer: C

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8. which one of the following on oxidation gives H_2O_2?

A. 2-Ethylanthraquinol

B. 3-ethyanthraaqunione

C. anthracence or phenontheene

D. 4-ehtylanthracenae

Answer: A

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9. Industrially H_2O_2 is obtained from :

A. 2-ethyl anthraquniol by oxidation and then reduction in a cyclic process

B. H_2SO_5

C. $H_2S_2O_8$

D. BaO_2

Answer: A

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10. Oidentify the incrrect statement ?

A. The intermediate products obtained during eletrolysis of 50% H_2SO_4 are $H_2S_2O_8$ and H_2SO_5

B. Complate hydrolysis of one mole of Marshall's acid gives one mole of H_2O_2 and two moles of sulphuric acid

C. H_2S_4, H_2SO_5 and $H_2S_2O_8$ all acts as oxidising agents.

D. During electrolysis of 50% H_2AO_4, H_2O_2 is obtained near anode.

Answer: D

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11. when changes from gaseous phase to soild phase , which one of the following startements is correct regarding H_2O_2?

A. dral angle changes from $920^\circ \text{to} 111^\circ$

B. Bond angle changes from $101^\circ \text{to} 94^\circ$

C. The dilhereal angle chages changes from $94^\circ \text{ to } 101^\circ$

D. Bond angle changes from $94^\circ 48 \text{ to} 101^\circ 54$

Answer: D

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12. The structure of H_2O_2 is

A. Planar and tetraheassdral

B. non-planer and non linear

C. Trigonal planear

D. Linear

Answer: B

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13. Which of the following process uses water gas shift reaction?

A. MercK's process

B. Lane ,s process

C. Permutitprocess

D. Bosch's process

Answer: D

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14. which one of the following contains more number of peroxy linkages ?

A. H_2TiO_4

B. CrO_5

C. H_3PO_5

D. $H_2S_2O_8$

Answer: b

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15. (I). H_2O_2 is non- linear compound

(II) In H_2O_2 , the hydroxyl group are not in same plane

(III) The dihedral angle in H_2O_2 in its vapour phase is 90°

(IV) H_2O_2 is planer molecule.

then the correct statement (s) is/are:

A. I and IV only

B. I and II only

C. III and IV only

D. I,II,III,and Iv

Answer: B

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16. the dipole moment of H_2O_2 is 2.1 D while thaat of water is 1.84 D But ,water (H_2O) ios a b=etter solvent than that of H_2O_2 because

A. Its dipole moment is less

B. it is less corrosive

C. H_2O gets ionised during chemical reactions

D. H_2O_2gets decomposed during chemical reactions

Answer: D

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

A. SO_2

B. H_2O_2

C. KNO_3

D. $Pb(NO_3\_(2)$

Answer: B

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18. The H-OO bondangle and O-H bond lengths are 101.9° and 98.8p, resectvly in solid phase instead of 94.8° and 95 pm in gaseous phase instedad tat the structure of H_2O_2 this indicates that the struture of H_2O_2 in solid and gasous phases are different .this is due to

A. Intermolecular hydrogen bonding

B. Interamolecular hydrogen bonding

C. Van der Waal 's bonding

D. All ere true

Answer: A

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19. 10 volume H_2O_2 means _____.

A. $1ml H_2O_2$ gives $10mL O_2 at NTP$

B. $1g H_2O_\circ gives 10mL O_2 at NTP$

C. 1 mol H_2 gives 10mL O_2 at NTP

D. $10mL H_2O_2$ gives 1 Mol O_2 at NTP

Answer: A

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20. $34g$ of H_2O_2 is present in $1120ml$ of H_2O solution. This solution is called.

A. 10V solution

B. 20V solution

C. 34V solution

D. 32 V solution

Answer: A

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21. The volume of perhydrol which on decompostion gives 1L of $O_{\circ}$ at STP is

A. 10mL

B. 1mL

C. 100mL

D. 10L

Answer: A

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22. 10mL of a solution of H_2O_2 of 10 V secolouries es 100 ml of $KmnO_4$solution acidified with dilute sulphuric acid ,the amount of $KMnO_4$ in the given solution is (AW of k=39, Mn =55)

A. 1.125gm

B. 0.155gm

C. 0.56gm

D. 0.28gm

Answer: C

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23. $10mL$ of H_2O_2 solution (volume strength $= x$) requires $10mL$ of $N/0.56MnO_4^{\ominus}$ solution in acidic medium. Hence$x$ is

A. 5.6

B. 0.1

C. 10

D. 0.56

Answer: C

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24. A 5.0 mL solution of H_2O_2 liberates 1.27 g of iodine from an acidified KI solution. The percentage strenth of H_2O_2 is

A. 5.6

B. 1.7

C. 3.4

D. 11.2

Answer: C

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25. H_2 molecule has two electrons and two nuclei. In which form of hydrogen the spin of electrons and also the spin of nuclei are in opposite directions.

A. Ortho hydrogen

B. Para hydrogen

C. Meta hydrogen

D. β-hydrogen

Answer: B

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26. Select correct statement s

A. Ortho hydrogen are differwnt due to difference in their nuclear spins

B. Oththo and para hyydrogen are differeent due to differnceintheir electron spins

C. Parahydrogen has alower internal energy than that of ortho hydrogen

D. Para hydrogen is more stable at lower temparture

Answer: ACD

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27. $K_2Cr_2O_7 + H_2SO_4 + 4H_2O_2 \xrightarrow{\text{ether}}$

$2X + K_2SO_4 + 5H_2O,$

$X + 6H_2SO_4 \rightarrow 2Y + 6H_2O + 7Z(g)$

the correct statement (s) regarding the above eq:

A. The oxidaion state of central stom in X I s+10 and has butter fly stereucture

B. The oxidation state of central atom In Y is +3 and has green coloure

C. Z is colourless paramagnetic gas

D. The oxidation state of central stom in X is +^ and has 2 peroxy linkages with butterfly like stucture.

Answer: BCD

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28. Incorrect statement (s) regarding H_2O_2 is s/are

A. H_2O_2has higher boiling point than water

B. AS physical state of H_2O_2 chsanges the bond angles and dihesdreal angles chages

C. H_2O_2 acts as a reading agent during its bleaching action

D. $H_2O_3$is manufactured by eleectrolysis of hot dilute aq solution of H_2SO_4

Answer: CD

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29. Peroxide linkage is present in :

A. MnO_2

B. CrO_2

C. H_2SO_5

D. BaO_2

Answer: BCD

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30. Which one the following reaction gives hydrogen peroxdide ?

A. $Na_2O_2 + H_2O \xrightarrow{Ice - cold}$

B. Hydrated $BaO_2 + CO_2 + H_2O \rightarrow$

C. Aerical oxidation of 2-rthyl anthraqumiol

D. $KO_2 + H_2O \rightarrow$

Answer: ABCD

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31. Identify the correct statement :

A. Pure H_2O_2 is weakly acidic

B. Aq H_2O_2 is neutral towards litmus

C. In alkaline solution H_2O_2 is a disproportion ation reaction .

D. Decompostion of H_2O_2 is a disproportionationreaction.

Answer: ABCD

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32. Excess of Kl and Dil H_2SO_4 were mixed in 50 mL H_2O_2 thus ,$I_\circ$ liberated requirs 20mL of 0.1 N $Na_2S_2O_3$,the incrrect statemen among the following

A. Strength of hyrogen peroxide is 100V \

B. Strength of$H_2O_\circ \in$ g.L^(-1)`is 0.68

C. Strength of H_2O_2 in $g.\, mL^{-1}$ is 0.68

D. Molerityof $H_2O_2$is 1M

Answer: ACD

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33. Which of the following statements is/are correct about $6.8\,\%$ stregnth of H_2O_2.

A. Its normality I s4N

B. Its molarity is 2M

C. Its volume strength is 22.4V

D. Volum strenght $=11.2 \times \text{Molarity}$

Answer: ABCD

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34. In which of the following proces ,hydrogen is produced

A. Bosch method

B. Lane process

C. Uyeno 's mrhtod

D. Merck process

Answer: ABC

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35. Permanent hardness is due to $CI^{\ominus}$ and SO_4^{2-} of Mg^{2+} and Ca^{2+} and is removed by adding Na_2CO_3.

$CaSO_4 + Na_2CO_3 \rightarrow CaCO_3 + Na_2SO_4$
$CaCl_2 + Na_2CO_3 \rightarrow CaCO_3 + 2NaCl$

Which of the following statements is / are correct?

A. If hardness is 100PPm $CaCO_3$ the amount of Na_2CO_3 required to soften 10L of hard water is 10.6h

B. If hardness is 100PPm, $CaCO_3$,the amout of Na_2CO_3 required to soften is 10l of hard water is 10.6g

C. If hardness id 420 ppm $MgCO_3$ the amout of $Na_{\circ}CO_3$ required to soften 10L of hard water is 5.3h

D. If hardness id 420 ppm $MgCO_3$ the amout of $Na_{\circ}CO_3$ required to soften 10L of hard water is 53.0g

Answer: A,D

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36. Which of the following statements is/are correct about 6.8% stregnth of H_2O_2.

A. Its normality is 4N

B. Its molarity is 2M

C. Its volume stremght is 22.4V

D. Volume strength $=11.2 \times M$

Answer: A,B,C,D

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37. Which of the following statements about the following reaction is / are not correct?

$$Cr_2O_7^{2-} + 3H_2O_2 + 8H^{\oplus} \rightarrow 2Cr^{3+} + 7H_2O + 3O_2$$

A. H_2O_2 is oxidised to O_2

B. H_2O_2 is reduced to H_2O

C. the oxidation number if chrominum atom changes by 3

D. Hydrogen ions aarae oxidised to H_2O

Answer: B,D

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38. Which of the foollowing is /are basic huydroide ?

A. HCl

B. NH_3

C. H_2S

D. PH_3

Answer: B,D

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39. The presence of water can be inferred by

A. Using anhydrous $CUSO_4$ which chahges colopur

B. Using anhydrous $CoCl_2$ which changes colour

C. the use of hydrated $CuSO_4$

D. Taste and smell

Answer: A,B

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40. Which of the following statement is(are) correct?

A. H_2O is a pale blue viscous liquid

B. H_2O_2 can act as an oxidizing as well as a reducing agent

C. In H_2O_2 the two hydroxyl groups lie on the same phase

D. None of these

Answer: A::B

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41. Hydrogen peroxide can be prepared by the action of dil. H_2SO_4 or H_3PO_4 on barium peroxide or by bubbling carbon dioxide through a thin paste of barium peroxide. On an industrial scale , it can be prepared by hydrolysis of peroxodisulphuric acid obtained by electrolysis of 50% H_2SO_4 or an equimolar mixture of H_2SO_4 and ammonium sulphate .The strength of H_2O_2 solution can be expressed in a number ways namely normality , molarity , percentage strength and volume of O_2 produced at N.T.P by decomposition of 1 mL of H_2O_2 acts as an oxidising as well a reducing agent both in acidic and basic media.

The correct increasing order of the acidity of CO_2, H_2O and H_2O_2 is

A. $CO_2 < H_2O_2 < H_2O$

B. $H_2O_2 < H_2O_2 < CO_2$

C. $H_2O < H_2O_2 > CO_2$

D. $H_2O_2 > CO_2 < H_2O$

Answer: B

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42. Hydrogen peroxide can be prepared by the action of dil. H_2SO_4 or H_3PO_4 on barium peroxide or by bubbling carbon dioxide through a thin paste of barium peroxide. On an industrial scale , it can be prepared by hydrolysis of peroxodisulphuric acid obtained by electrolysis of 50%

H_2SO_4 or an equimolar mixture of H_2SO_4 and ammonium sulphate .The strength of H_2O_2 solution can be expressed in a number ways namely normality , molarity , percentage strength and volume of O_2 produced at N.T.P by decomposition of 1 mL of H_2O_2 acts as an oxidising as well a reducing agent both in acidic and basic media.

The volume of 10 volume H_2O_2 solution that decolourises 200 ml of 2N $KMnO_4$ solution in acidic medium is

A. 112 ml

B. 336 ml

C. 200 ml

D. 224 ml

Answer: D

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43. Hydrogen peroxide can be prepared by the action of dil. H_2SO_4 or H_3PO_4 on barium peroxide or by bubbling carbon dioxide through a thin paste of barium peroxide. On an industrial scale , it can be prepared by hydrolysis of peroxodisulphuric acid obtained by electrolysis of 50% H_2SO_4 or an equimolar mixture of H_2SO_4 and ammonium sulphate .The strength of H_2O_2 solution can be expressed in a number ways namely normality , molarity , percentage strength and volume of O_2 produced at N.T.P by decomposition of 1 mL of H_2O_2 acts as an oxidising as well a reducing agent both in acidic and

basic media.

Hydrolysis of one mole of peroxodisulphuric acid produces

A. Two moles of sulphuric acid only

B. Two moles of peroxmonosulphruic acid

C. one mole of sulphuric acid , and one mole of peroxomonosulpuric acid

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

Answer: C

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44. Hydrogen peroxide can be prepared by the action of dil. H_2SO_4 or H_3PO_4 on barium peroxide or by bubbling carbon dioxide through a thin paste of barium peroxide. On an industrial scale , it can be prepared by hydrolysis of peroxodisulphuric acid obtained by electrolysis of 50% H_2SO_4 or an equimolar mixture of H_2SO_4 and ammonium sulphate .The strength of H_2O_2 solution can be expressed in a number ways namely normality , molarity , percentage strength and volume of O_2 produced at N.T.P by decomposition of 1 mL of H_2O_2 acts as an oxidising as well a reducing agent both in acidic and basic media.

In acidic medium , H_2O_2 acts a reducing agent in its reaction with

A. $FeSO_4$

B. $KMnO_4$

C. K_2MnO_4

D. $K_4[Fe(CN)_6]$

Answer: B

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45. Hydrogen peroxide can be prepared by the action of dil. H_2SO_4 or H_3PO_4 on barium peroxide or by bubbling carbon dioxide through a thin paste of barium peroxide. On an industrial scale , it can be prepared by hydrolysis of peroxodisulphuric acid obtained by electrolysis of 50% H_2SO_4 or an equimolar mixture of H_2SO_4 and ammonium sulphate .The strength of H_2O_2 solution can

be expressed in a number ways namely normality , molarity , percentage strength and volume of O_2 produced at N.T.P by decomposition of 1 mL of H_2O_2 acts as an oxidising as well a reducing agent both in acidic and basic media.

What will be the volume of oxygen at NTP liberated upon the complete decomposition of 100 mL of the 2M H_2O_2 solution?

A. 2.24 L

B. 22.4 L

C. 44.8 L

D. 11.2 L

Answer: A

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46. Hydrogen peroxide can be prepared by the action of dil. H_2SO_4 or H_3PO_4 on barium peroxide or by bubbling carbon dioxide through a thin paste of barium peroxide. On an industrial scale , it can be prepared by hydrolysis of peroxodisulphuric acid obtained by electrolysis of 50% H_2SO_4 or an equimolar mixture of H_2SO_4 and ammonium sulphate .The strength of H_2O_2 solution can be expressed in a number ways namely normality , molarity , percentage strength and volume of O_2 produced at N.T.P by decomposition of 1 mL of H_2O_2 acts as an oxidising as well a reducing agent both in acidic and basic media.

Hydrogen peroxide is used as

A. An oxidant only

B. A reductant only

C. An acid only

D. An oxidant , a reductant and an acid

Answer: D

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47. A compound C is produced on an industrial scale bt oxidation of 2-ethylanthraquinol by air. Compound C decolourises an acidic solutio of $KMnO_4$ with the evolution of O_2 Compound C produces a brown precipitate when it reacts with $MnSO_4$ in alkaline

solution.

Compound C reacts with $K_2Cr_2O_7$ in acidic solution in presence of an organic sovent impart_colour to the orgaanic phase

A. orange

B. yellow

C. blue

D. green

Answer: C

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48. A compound C is produced on an industrial scale bt oxidation of 2-ethylanthraquinol by air. Compound C decolourises an acidic solutio of $KMnO_4$ with the evolution of O_2 Compound C produces a brown precipitate when it reacts with $MnSO_4$ in alkaline solution.

In idustrial preparation of compound C,2-ethyl anthraquinone is also produced which can be converted back 2-tehyl anthraquinol by

A. Addintion of strong acid

B. Addition of strong base

C. Catalytic oxidation

D. Catalytic reduction suninh H_2 / Pd

Answer: D

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49. At one time H_2O_2 was obtained by electrolysis of 50% H_2SO_4 The process of electrolysis involves following reaction :

$2H_2SO_4 \rightarrow 2H^+ + 2HSO_4^-$

At cathode: $2H^+ + 2e^- \rightarrow H_2 \uparrow$

At anode: $2HSO_4^- \rightarrow X + 2e^-$

$X + H_2O \rightarrow Y + Z, Y + H_2O \rightarrow Z + H_2O_2$

Which of the following statements are correct with respect to X,Y and Z ? (i) In all compounds the covalency of Sulphur is 6

(ii) Peroxy bond is present in both Y and Z

(iii)Basicity of all acids is 2

In X there is no S-S linkage

A. ii,iv

B. ii, iii, iv

C. I,ii, iv

D. I,iii,iv

Answer: D

View Text Solution

50. At one time H_2O_2 was obtained by electrolysis of 50% H_2SO_4 The process of electrolysis involves following reaction :

$2H_2SO_4 \rightarrow 2H^+ + 2HSO_4^-$

At cathode: $2H^+ + 2e^- \rightarrow H_2 \uparrow$

At anode: $2HSO_4^- \rightarrow X + 2e^-$

$X + H_2O \rightarrow Y + Z, Y + H_2O \rightarrow Z + H_2O_2$

Among X, Y and Z which is an oxidising agent ?

A. only X

B. Only Y

C. X,Y and Z

D. only Z

Answer: C

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51. At one time H_2O_2 was obtained by electrolysis of 50% H_2SO_4 The process of electrolysis involves following reaction :

$2H_2SO_4 \rightarrow 2H^+ + 2HSO_4^-$

At cathode: $2H^+ + 2e^- \rightarrow H_2 \uparrow$

At anode: $2HSO_4^- \rightarrow X + 2e^-$

$X + H_2O \rightarrow Y + Z, Y + H_2O \rightarrow Z + H_2O_2$

The number of -OH groups in X:

A. 3

B. 2

C. 4

D. zero

Answer: B

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52. Matching the following

View Text Solution

53. Matching the following

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54. Matching the isotopes of hydrogen (and compounds) in Column I with their properities given in Column II and

mark the correct option from the codes given below,

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55. Match the hydrides in Column I with their nature (may be more than one) given in Column II and mark the correct answer option from thecodes given below.

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56. The number of species having peroxy bonds among the following

Pertitanic acid , Na_2O_2, PbO_2, CrO_5

Perchloric cid, Potassium permanganate

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57. One kilogram sample of hard water contains 4.44 mg of $CaCl_2$ and 1.9 mg of NaCl. The total hardness in tems of ppm of $CaCO_3$ is :

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58. $xCr^{+3} + yH_2O_2 + mOH^- \rightarrow zCO_4^{-2} + nH_2O$

In the above balance the equation , what is the value of x+y+z is :

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59. Give the total number of peroxide linkages present in Caro's acid, Marshall's acid and hydrogen peroxide

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60. What is the sum of protons, electrons and neutrons in the heaviest isotope of hydrogen?

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61. What is the sum of protons, electrons and neutrons in the lightest isotope of hydrogen?

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62. How many moles of ammonia are produced when one mole of calcium nitride reacts with water?

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63. How many moles of phosphine are produced when one of the calcium phosphides reacts with water?

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

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Level Vi

1. Which of the following statement is incorrect regarding the complete hydrolu=ysis of Marshall's acid?

A. Caro's acid is an intermediate product

B. Two molecules of H_2SO_4 and one molecule of H_2O_2 are the final product

C. Hybridisation and oxidation state of central atom remain unchanged in the final product

D. Both final products can act as oxidising as well as reducing agent

Answer: D

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2. The volume strength of $10NH_2O_2$ is :

A. 112

B. 11.2

C. 0.112

D. 56

Answer: D

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3. I. Bleaching action of H_2O_2 is its oxidising property

II. H_2O_2 oxidises benezene to phenol in the presence of Fenton's reagent

III. Hydrogen gas is evolved if H_2O_2 oxidises formaldehyde to formic acid

IV. H_2O_2 gives red colouration with ethereal solution of acidified $K_2Cr_2O_7$

Then the incorrect statements is $/$ are

A. Only IV

B. Only I and III

C. Only II and IV

D. I,II,III and IV

Answer: A

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4. The molarity of 20 ml of 20 volumes H_2O_2 is

A. 0.9

B. 1.8

C. 2.7

D. 1.9

Answer: B

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5. Identify the incorrect statements

A. H_2O_2 gives yellow colour on reaction with $Cr(OH)_3$

B. H_2O_2 gives blue colouration with titaniun salt solution

C. H_2O_2 decolourises pink colour of $KMnO_4$

D. H_2O_2 turns starch iodide paper to blue

Answer: B

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6. The boiling point of water is exceptionally high because

A. Of covalent bond between H and O

B. Water is linear in structure

C. Inter-molecular hydrogen bonding

D. Water molecule has high dielectric constant

Answer: C

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7. Which of the following statement is/are correct regarding H_2O_2 ?

A. It oxiides Fe(II) to Fe(III) in acidic medium

B. It is obtained by electrolysis of dilute H_2SO_4

C. It reduces Mn(VII) to Mn(II)

D. It is a weak base

Answer: D

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8. Sample of water has hardness 77.5ppm Ca^{2+}. If this is passed through an ion exchange column where Ca^{2+} is replaced by H^{+}, what is the pH of water after it has been so treated

A. 1.4

B. 4.4

C. 2.4

D. 5.4

Answer: C

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9. Which one of the following satements is / are correct?

1) H_2O_2 soluytions are stored in plastic or wax coated glass vessels since contact with rough surfaces acceleartes its decomposition

2) Urea, sodium stannate, acetanilide, sodium pyrophosphate etc., act as stabilizers(inhibitors)(negative catalyst) for the decomposition of H_2O_2

3) Silica, MnO_2,iron, manganese, alumina act as accelerters(positive catalysts) for teh decomposition of H_2O_2

H_2O_2 is a very powerful oxidising agent and a poor reducing agent

A. All are correct

B. 1,2,4 correct

C. 1,3 correct

D. 2,4 correct

Answer: A

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10. An alkaline solution of H_2O_2 converts benzene into phenol in the presence of $FeSO_4$.

Thus, the solution of alkaline $H_2O_2 + FeSO_4$ is a strong oxidising agent and is known as

A. Fenton's reagent

B. Tollen's reagent

C. Etar's reagent

D. Schmidt's reagent

Answer: A

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11. If one assume linear structure instead of bent structure for water then which on of the following properties cannot be explained ? .

A. The formation of intermolecular hydrogen bonds in water

B. The high boiling point of water

C. Solubility of polar compounds in water

D. Ability of water to form co-ordinate covalent bonds.

Answer: C

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

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

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

C. $H^-(aq) + H_2O(l) \rightarrow H_3O^+$

D. $H^-(aq) + H^+(aq) \rightarrow H_2(g)$

Answer: B

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13. When the same amount of zinc is treated separately with excess of sulphric acid and excess of sodium hydroxide, the ratio of volume of hydrogen evolved is

A. $1:1$

B. $1:4$

C. $4:1$

D. $9:7$

Answer: A

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14. For preparing H_2O_2 in the laboratory

A. MnO_2 is added to dilute cold H_2SO_4

B. BaO_2 is added to CO_2 vubbling through cold water

C. pbO_2 is added to an acidified solution of $KMnO_4$

D. Na_2O_2 is added to CO_2 bubbling through cold water

Answer: B

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15. Molarity and volume strength of perhydrol respectively

A. 100M and 8.9 V

B. 8.9 M and 100V

C. 8.9M and 30V

D. 30M and 8.9 V

Answer: B

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16. The lead of the lead paintings becomes black due to formation of..... H_2O_2 converts the black colour to white lead is.....

A. $H_2S, PbSO_4$

B. $PbS, PbSO_4$

C. $PbSO_4, PbS$

D. PbS, H_2S

Answer: B

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17. Bleaching action of H_2O_2 is due to its :

A. Oxidation

B. Reduction

C. Acidic behaviour

D. Basic nature

Answer: A

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18. Which of the following is the most suitable test to identify water

A. Smell the liquid

B. Addition of anhydrous copper sulphate turns it blue

C. Dip a litmus paper into the liquid and look for a colour change

D. Moisten $K_2Cr_2O_7$ paper with the solution

Answer: B

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19. Which of the folowing statements are correct

A. H_2O_2 reduces MnO_4^- both in acidic and basic media

B. H_2O_2 oxidises Fe^{2+} both in acidic and basic media

C. H_2O_2 oxidises Mn^{2+} ions in basic media

D. H_2O_2 liberates I_2 from acidified KI solution and reduces I_2 to I^- ions in basic media

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

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20. Which of the following statements about H_2O_2 is not true ?

A. H_2O_2 is used to clean oil paintings

B. H_2O_2 acts as oxidising as well as reducing agent

C. Two hydroxyl group in H_2O_2 lie in the same plane

D. It retains same structural in liquid and solid form

Answer: A::B::D

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21. H_2O_2 is "5.6 volume" then

A. It is 1.7% weight by vollume

B. It is 1 N

C. It is 1 M

D. It is 5.6 M

Answer: A::B

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22. Deuterium is heavy hydrogen, which is used in

A. Artificial transmutation of elements

B. In nuclear reactors as a moderator

C. As a tractor in chemical engineering

D. As a radioactive isotype of hydrogen used for dating

Answer: A::B::C

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23. Amongest the following, choose the correct statements

A. Atomic hydrogen is obtained by passing hydrogen through an electric car

B. hydrogen gas will not reduce heated aluminium oxide

C. Finely divided palladium absorbes large amount hydrogen gas

D. Pure nascent hydrogen is the best obtained by Na with C_2H_5OH

Answer: A::B::C

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24. Which of the following is / are matched properly ?

A. $H_2O_2 + 2OH^- \rightarrow 2H_2O + O_2 + 2e^-$ .....

Reducing property in alkaline medium

B. $H_2O_2 \rightarrow 2H^+ + O_2 + 2e^-$..... Property in acidic medium

C. $H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$.....oxidising property in acidic medium

D. $H_2O_2 \rightarrow H_2O + O$..... Potential equation in alkaline medium

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

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25. Which of the following does not give hydrogen peroxide on hydrolysis ?

A. $H_2S_2O_3$

B. H_2SO_5

C. $H_2S_2O_7$

D. $H_2S_4O_6$

Answer: A::C::D

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26. Which of the following is a Deuterolysis reaction

A. $SO_3 + D_2O \rightarrow D_2SO_4$

B. $CaC_2 + 2D_2O \rightarrow Ca(OD)_2 + 2ND_3$

C. $Mg_3N_2 + 6D_2O \rightarrow 3Mg(OD_2) + 2ND_3$

D. $AlCl_3 + 3D_2O \rightarrow Al(OD)_3 + 3DCl$

Answer: B::C::D

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27. Which is / are true statements?

A. The layer of ice on the surface of river in the winter acts as a thermal insulator between the water below and the air above

B. The fish and other marine orgnims are enabled to survive long periods of freezing weather due to the fact that ice is lighter than water

C. When ice is formed volume decreases

D. Density of ice is maximum at 0° C

Answer: A::B

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28. 1.78N of H_2O_2 solution is :

A. 10 volumes of H_2O_2

B. 3.03% $\left(\frac{w}{v}\right)$ of H_2O_2

C. 2.56M H_2O_2

D. 1 mL H_2O_2 liberates 10 mL of O_2 at STP

Answer: A::B::D

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29. Which of the following statements is / are correct?

A. H_2O_2 is reduced to O_2 by a strong reducing agent

B. H_2O_2 is a non-planer molecule

C. The formation of CrO_5 from $Cr_2O_7^{2-}$ ion by the action of H_2O_2 in an acid medium is not a redox reduction

D. H_2O_2 is oxidised to OH^- ions by a two electron change

Answer: A::B::D

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30. (i)

$$\left[Fe(CN)_6\right]^{x-} + H_2O_2 + H^+ \rightarrow \left[Fe(CN)_6\right]^{y-} + H_2O$$

(ii)

$$\left[Fe(CN)_6\right]^{p-} + H_2O_2 + OH^- \rightarrow \left[Fe(CN)_6\right]^{q-} + H_2O$$

Select the correct statements:

A. x and y are 3 and 4 respectively

B. p and q are 3 and 4 respectively

C. in (i), H_2O_2 acts as an oxidising agent

D. In (ii), H_2O_2 acts as an reducing agent

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

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31. The oxidation states of the most electronegative element in the products of the reaction between BaO_2 with dilute H_2SO_4 are

A. -1

B. $+1$

C. -2

D. 0

Answer: A::C

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32. The hardness of water due to HCO_3 is $122ppm$. Select the correct statement(s).

A. The hardness of water in terms of $CaCO_3$ is 200 ppm

B. The hardness of water in terms of $CaCO_3$ is 100 ppm

C. The hardness of water in terms of $CaCO_3$ is 222 ppm

D. The hardness of water in terms of $CaCO_3$ is 95 ppm

Answer: B::D

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33. xg of H_2O_2 requires $100mL$ of $M/5KMnO_4$ in a titration in a solution having $pOH = 1.0$ Which of the following is/are correct?

A. The value of x is 1.7 g

B. The value of x is 0.34 g

C. $MnO_4^{\oplus}$ changes to MnO_4^{2-}

D. H_2O_2 changes to O_2

Answer: B::C::D

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34. 20 " mL of " H_2O_2 is reacted completely with acidified $K_2Cr_2O_7$ solution 40 " mL of " $K_2Cr_3O_7$ solution was required to oxidised the H_2O_2 completely. Also, 2.0 " mL of " the same $K_2Cr_2O_7$ solution required 5.0 " mL of " a 1.0 M $H_2C_2O_4$ solution to reach equivalence point. Which of the following statements is/are correct?

A. The H_2O_2 solution is 5M

B. The volume strength of H_2O_2 is 56 V

C. The volume strength of H_2O_2 is 112 V

D. If 40 mL more H_2O_2 solution, the volume strength of the resulting solution is changed to 16.8 V

Answer: A::B::D

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35. In the reaction of sodium hydride and water:

A. Sodium is reduced

B. Hydrogen is oxidised

C. Hydrogen is oxidised

D. Hydrogen is reduced

Answer: B::C

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36. Hardness of water is measured in terms of ppm $CaCO_3$. It is the amount in gms of $CaCO_3$ present in 10^6 gms of H_2O.In a sample of 10 litre water,0.56 gm of CaO is required to remove temporary hardness of HCO_3^-. Permanent hardness due to SO_4^{2-} and Cl^- of C^{2+} and Mg^{2+} and is removed y the addition of Na_2CO_3. Temperature hardness is due to HCO_3^- of Ca^{2+} and Mg^(2+). $Itisremovedbytheadditionof CaO.$

Ca(HCO_(3))_(2)+CaOrarr2CaCO_(3)+H_(2)O

$massofCaOrequired \rightarrow \prec i\pi tate2gmof$CaCO_(3)` is

A. 2.00 gm

B. 0.56 gm

C. 0.28 gm

D. 1.12 gm

Answer: B

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37. Temporary hardness is

A. 200 ppm

B. 100 ppm

C. 50 ppm

D. 25 ppm

Answer: A

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38. $CaCl_2 + Na_2CO_3 \rightarrow 2NaCl + CaCO_3$

$CaSO_4 + Na_2CO_3 \rightarrow CaCO_3 + Na_2SO_4$

If hardness is 100 ppm amount of Na_2CO_3 required to soften 10 lt. Of hard water is

A. 2.12 gm

B. 0.10 gm

C. 10.6 gm

D. 1.06 gm

Answer: D

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Passage Ii

1. Hydrogen peroxide is a powerful oxidising agent.

It is an electron acceptor in acidic and alkaline mediums .

$H_2O_2 + 2H^+ + 2e^- \rightarrow H_2O$ (in acidic medium)

$H_2O_2 + 2e^- \rightarrow 2OH^-$ (in alkaline medium)

It can also act as reducing agent towards powerful oxidising agents . $H_2O_2 \rightarrow 2H^+ + O_2 + 2e$

In alkaline medium , however , its reducing nature is more effective . $H_2O_2 + 2OH^- \rightarrow 2H_2O + O_2 + 2e^-$

In which of the following reactions , H_2O_2 acts a reducing agent ?

A. $PbO_2 + H_2O_2 \rightarrow PbO + H_2O + O_2$

B. $Na_2SO_3 + H_2O_2 \rightarrow Na_2SO_4 + H_2O$

C. $2Kl + H_2O_2 \rightarrow 2KOH + I_2$

D. $KNO_2 + H_2O_2 \rightarrow KNO_3 + H_2O$

Answer: A

View Text Solution

2. Hydrogen peroxide is a powerful oxidising agent.

It is an electron acceptor in acidic and alkaline mediums .

$H_2O_2 + 2H^+ + 2e^- \rightarrow H_2O$ (in acidic medium)

$H_2O_2 + 2e^- \rightarrow 2OH^-$ (in alkaline medium)

It can also act as reducing agent towards powerful oxidising agents . $H_2O_2 \rightarrow 2H^+ + O_2 + 2e$

In alkaline medium , however , its reducing nature is more effective . $H_2O_2 + 2OH^- \rightarrow 2H_2O + O_2 + 2e^-$

In which of the following reactions , H_2O_2 acts as an oxidising agent ?

A. $IO_4^- + H_2O_2 \rightarrow IO_3^- + H_2O + O_2$

B. $2I^- + H_2O_2 + 2H^+ \rightarrow I_2 + 2H_2O$

C. $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$

D.

$$2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 8H_2O + 5O_2$$

Answer: B

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3. Hydrogen peroxide is a powerful oxidising agent.

It is an electron acceptor in acidic and alkaline mediums .

$H_2O_2 + 2H^+ + 2e^- \rightarrow H_2O$ (in acidic medium)

$H_2O_2 + 2e^- \rightarrow 2OH^-$ (in alkaline medium)

It can also act as reducing agent towards powerful oxidising agents . $H_2O_2 \rightarrow 2H^+ + O_2 + 2e$

In alkaline medium , however , its reducing nature is more effective . $H_2O_2 + 2OH^- \rightarrow 2H_2O + O_2 + 2e^-$

In the reaction ,

$H_2O_2 + O_3 \rightarrow H_2O + 2O_2$, H_2O_2 acts as :

A. An acid

B. An oxidizing

C. A reducing agent

D. Both as a reducing agent and an oxidising agent

Answer: C

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4. Strength of the sample of H_2O_2 is generally expressed in terms of volume strength . It means the volume of oxygen liberated at NTP by heating one volume of H_2O_2 . The concentration of H_2O_2 in a solution can also expressed as percentage of H_2O_2 in solution . Normality of this solution can be calculated if the equivalent mass of H_2O_2 is known .

25 mL of H_2O_2 solution was added to the excess of acidified KI solution . The iodine so liberated required 40 mL of $0.1NNa_2S_2O_3$ solution . what is normality of H_2O_2 solution ?

A. 0.08

B. 0.02

C. 0.16

D. 0.20

Answer: C

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5. Strength of the sample of H_2O_2 is generally expressed in terms of volume strength . It means the volume of oxygen liberated at NTP by heating one volume of H_2O_2 . The concentration of H_2O_2 in a solution can also expressed as percentage of H_2O_2 in solution . Normality of this solution can be calculated if the equivalent mass of

H_2O_2 is known .

Percentage strength of the above H_2O_2 solution is

A. 0.126

B. 0.272

C. 0.544

D. 0.136

Answer: B

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6. Strength of the sample of H_2O_2 is generally expressed in terms of volume strength . It means the volume of oxygen liberated at NTP by heating one volume of H_2O_2 .

The concentration of H_2O_2 in a solution can also expressed as percentage of H_2O_2 in solution . Normality of this solution can be calculated if the equivalent mass of H_2O_2 is known .

Volume strength of above H_2O_2 solution is ?

A. 0.448

B. 0.632

C. 0.896

D. 0.556

Answer: C

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7. H_2O_2 is an unstable liquid . On standing or on heating it decomposes to H_2O and O_2. H_2O_2 can acts as oxidising agent and reducing agent . The concentration of H_2O_2 is expressed differently with volume strength and the concentration of H_2O_2 at a particular time is measured by titrating it with acidified $KMnO_4$ or by titrating liberated I_2 from acidified KI and H_2O_2 with hypo solution . A sample of H_2O_2 has 3.4 g of H_2O_2 in 100 mL solution . The bottle containing this sample was kept at 25^0C for 15 days then 20mL of this sample is treated with excess KI and the liberated iodine requires 50 mL , 0.2 M $Na_2S_2O_3$ solution . Assume the volume of solution remains unchanged .

$Thevolumestren > hof$H_(2)O_(2)` in the begining and after 15 days are

A. $5.6, 3.4$

B. $11.2, 2.8$

C. $5.6, 4.6$

D. $11.2, 5.6$

Answer: B

View Text Solution

8. H_2O_2 is an unstable liquid . On standing or on heating it decomposes to H_2O and O_2. H_2O_2 can acts as oxidising agent and reducing agent . The concentration of H_2O_2 is expressed differently with volume strength and the concentration of H_2O_2 at a particular time is

measured by titrating it with acidified $KMnO_4$ or by titrating liberated I_2 from acidified KI and H_2O_2 with hypo solution . A sample of H_2O_2 has 3.4 g of H_2O_2 in 100 mL solution . The bottle containing this sample was kept at 25^0C for 15 days then 20mL of this sample is treated with excess KI and the liberated iodine requires 50 mL , 0.2 M $Na_2S_2O_3$ solution . Assume the volume of solution remains unchanged .

The volume of H_2O_2 sample (after 15 days) that is required to reduce 40 mL of 0.2 M acidified $KMnO_4$ solution is :

A. 40 mL

B. 200 mL

C. 80 mL

D. 100 mL

Answer: C

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Matrix Matching

1. Match the following : H_2O_2 reacts with compounds of column-I

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2. Match the following

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3. Match the reactions in Column I with nature of water in Column II and mark the correct option from the codes given below :

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4. Match the species in Column I with corresponding properties in Column II and select the answer from the

codes given .

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Interger Type Questions

1. If the total number of neutrons present in D_2O^{18} molecules is x then the value of $\frac{x}{2}$ is __.

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

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3. What is the Normality of a commercial sample H_2O_2 of the $16.8V$?

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4. What is the molarity of H_2O_2 of the $11.2V$ (volume strength)?

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5. 100 mL of tap water containing $Ca(HCO_3)_2$ was titrated with N/50 HCl with MeOH as indicator . If 30 mL of

HCl were required , calculate the temporary hardness as parts of $CaCO_3$ per 10^6 parts of water . If your answer is 'a x 100' , what is the value of 'a'.

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6. What is the molarity of H_2O_2 of the 11.2 V (volume strength) ?

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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 $KMnO_4$ the volume of $KMnO_4$ in litre is

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8. The oxidation state of oxygen of H_2O_2 in the final products when it reacts with $ClO_3^{\ominus}$ is

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9. What is the oxidation state of oxygen of H_2O_2 in the final products when it reacts with As_2O_3?

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10. Washing soda ($Na_2CO_{3.10}H_2O$) is widely used in softening of hard water. If $1L$ of hard water requires

0.0143g of washing soda, what is hardness of water in terms of ppm of $CaCO_3$?

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