CHEMISTRY

BOOKS - KUMAR PRAKASHAN KENDRA CHEMISTRY (GUJRATI ENGLISH)

HYDROGEN

Section A Question

1. Justify the position of hydrogen in the periodic table on the basis of its electronic configuration.

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2. Discuss the position of hydrogen in the modern periodic Table.

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3. Why does hydrogen occur in a diatomic form rather than in a monoatomic form under normal conditions ?

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4. Write short note on Dihydrogen.

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5. Write the names of isotopes of hydrogen what is the mass ratio of these isotopes ?

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6. Explain Isotopes of Hydrogen in short.

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7. Explain Laboratory Preparation of Dihydrogen.

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8. How can the production of dihydrogen, obtained from .coal gasification. be increased ?

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9. Describe the bulk preparation of dihydrogen by electrolytic method what is the role of an electrolyte in this process ?

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10. Explain commercial production of Dihydrogen.

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11. Complete the following reactions .

(i) $H_{2(g)} + M_mO_{o(s)} \xrightarrow{\Delta}$

(ii) $CO_{(g)} + H_{2(g)} \xrightarrow[\text{catalyst}]{\Delta}$

(iii) $C_3H_{8(g)} + 3H_2O_{(g)} \xrightarrow[\text{catalyst}]{\Delta}$

(iv) $Zn_{(s)} + NaOH_{(aq)} \xrightarrow{\text{heat}}$

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12. Write physical properties of Hydrogen.

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13. Discuss the consequence of high enthalpy of H-H bond in terms of chemical reactivity of dihydrogen.

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14. Explain chemical properties of Hydrogen.

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15. Give uses of Dihydrogen.

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16. How does the atomic hydrogen or oxyhydrogen torch function for cutting and welding purposes ? Explain

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17. Saline hydrides are known to react with water violently producing fire can CO_2, a well known fire extinguisher be used in this case ? Explain.

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18. What is Hydrides ? Give its types and Explain.

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19. Explain Ionic Hydrides (Saline Hydrides) covalent (molecular hydrides), Metal (hydrides) or (non stoichiometric hydrides) by Examples.

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20. Write short note on Ionic or Saline Hydrides.

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21. How can saline hydrides remove traces of water from organic compounds ?

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22. Arrange the following

(i) CaH_2, BeH_2 and TiH_2 in order of increasing electrical conductance.

(ii) LiH, NaH and CsH in order of increasing ionic character.

(iii) H- H, D- D and F-F in order of increasing bond dissociation enthalpy.

(iv) NaH, MgH_2 and H_2O in order of increasing reducing property.

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23. What do you expect the nature of Hydrides is, if formed by elements of atomic numbers 15, 19, 23 and 44 with dihydrogen ? Compare their behaviour towards water.

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24. What do you understand by (i) electron deficient (ii) electron precise and (iii) electron rich compounds of hydrogen ? Provide justification with suitable examples.

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25. What characteristics do you expect from an electron deficient hydride with respect an electron deficient hydride with respect to its structure and chemical reactions ?

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26. Write note on covalent or molecular hydrides.

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27. What do you understand by the form non stoichiometric hydrides ? Do you expect this type of the hydrides to be formed by alkali metals ? Justify your answer.

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

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29. Write note on Metallic or non stoichiometric hydrides.

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30. Do you expect the carbon hydrides of the type C_nH_{2n+2} to act as .Lewis. acid or base ? Justify your answer.

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31. Describe the usefulness of water in biosphere and biological system.

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32. Give general information about water (H_2O)

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33. Give importance of water for living organisms and write.

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34. What properties of water make it useful as a solvent ? What types of compound can it (i) dissolve and (ii) hydrolyse ?

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35. Physical properties of water.

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36. Compare the structures of H_2O and H_2O_2.

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37. Explain structure of water.

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38. Write bond angle and hybridisation type of water molecule

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39. Describe the structure of the common form of ice.

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40. Explain structure of ice.

View Text Solution

41. Give chemical properties of water.

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42. Write chemical reactions to show the amphoteric nature of water.

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43. What do you understand by the term .auto protolysis. of water ? What is its significance ?

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44. What is the difference between the forms .hydrolysis. and .hydration..

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45. Consider the reaction of water with F_2 and suggest in terms of oxidation and reduction, which species are oxidised reduced.

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46. Complete the following chemical reactions

(i) $PbS_{(s)} + H_2O_{2(aq)} \rightarrow$

(ii) $MnO^-_{4(aq)} + H_2O_{2(aq)} \rightarrow$

(iii) $CaO_{(s)} + H_2O_{(g)} \rightarrow$

(iv) $AlCl_{3(g)} + H_2O_{(l)} \rightarrow$

(v) $Ca_3N_{2(s)} + H_2O_{(l)} \rightarrow$

Classify the above into (a) hydrolysis , (b) redox and (c) hydration reactions.

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47. What is meant by .demineralised. water and how can it be obtained ?

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48. Explain Hard and Soft water

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49. Describe methods to remove the temporary Hardness of water (i) Boiling (ii) Clark.s is method.

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50. Describe method to remove the permanent hardness of water.

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51. What is meant by .demineralised. water and how can it be obtained ?

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52. Is demineralised or distilled water useful for drinking purposes ? If not, how can it be made useful ?

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53. Discuss the principle and method of softening of hard water by synthetic ion exchange resins.

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54. Write preparation of Hydrogen peroxide.

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55. Write physical properties of Hydrogen peroxide.

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56. Write structure of Hydrogen peroxide.

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57. Write chemical reactions to justify that hydrogen peroxide can function as an oxidising as well as reducing agent.

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58. Write chemical properties of hydrogen peroxide.

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59. How the H_2O_2 should be store ?

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60. How does H_2O_2 behave as a bleaching agent ?

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61. Give uses of Hydrogen peroxide.

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62. Knowing the properties of H_2O and D_2O. Do you think that D_2O can be used for drinking purpose ?

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63. What is heavy water ? Give uses of it.

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64. Give uses of Dihydrogen as a fuel.

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65. Do you expect different products in solution when aluminium (III) chloride and potassium chloride treated separately with (i) normal water (ii) acidified water and (iii) alkaline water ? Write equations wherever necessary.

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66. What do you understand by the terms : (i) hydrogen economy, (ii) hydrogenation, (iii) syngas ,(iv)water-gas shift reaction ,(v) fuel-cell ?

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67. Comment on the reactions of dihydrogen with (i) chlorine, (ii) sodium, and (iii) copper (II) oxide

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68. Would you expect the hydrides of N, O, and F to have lower boiling points than the hydrides of their subsequent group members ? Give reasons.

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69. Among NH_3, H_2O and HF which would you expect to have highest-magnitude of hydrogen bonding and why ?

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70. Can phosphorus with outer electronic configuration $3s^2, 3p^3$ form PH_5 ?

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71. How many hydrogen-bonded water molecule(s) are associated in $CuSO_4.5H_2O$?

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72. Calculate the strength of 10 volume solution of hydrogen peroxide.

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73. What is the volume of 1.5 N H_2O_2 ?

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74. Calculate volume strength of 30.36g/litre H_2O_2 solution.

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75. ___ is strength in %W/V of 40 volume containing H_2O_2 solution.

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Section A Question Try Your Self

1. The concentration of commercial H_2O_2 is 3.125 M than its grade is _____ volume.

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2. 12 L H_2O_2 solution contain 680 gm H_2O_2 then % W/V and volume of the solution is respectively ..... and .....

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3. The strength of H_2O_2 sample available form market is 8.32% W/V. The volume and molar concentration of this sample are _____and _____respectively

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Section B Objective Short Question

1. Which block elements form the interstitial hydrides compound ?

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2. What is "Calgon" ? Give its molecular formula.

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3. Which is act as an oxidising agent in the following reaction ?

$2H_2O_{(l)} + 2Na_{(s)} \rightarrow 2NaOH_{(aq)} + H_{2(g)}$

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4. Which compound is used to remove the temporary hardness of water in Clark.s method.

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5. What will be obtained by reaction of calcium carbide with heavy water ? Give its chemical reaction.

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6. Write bond angle and types of hybridization of water molecule.

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7. Why the boiling point of H_2O is high than the H_2S ?

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8. What is the half life period of tritium ?

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9. How the crystal form of ice will be examine ?

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10. How many isotopes of Hydrogen ? Give its Names.

View Text Solution

11. Hydrogen form stable diatomic molecule like which elements ?

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12. Complete the reaction : $8LiH + Al_2Cl_6 \rightarrow$ (?)

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13. Give reaction of I_2 with H_2O_2 in presence of basic medium ?

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14. From which source maximum hydrogen is obtained ?

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15. Which isotope of hydrogen emitted β-particle ?

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16. Reaction $HO_3SOOSO_3H_{(aq)} \xrightarrow[H_2O]{\text{Hydrolysis}} 2H_2SO_4 + x$. What is product x ?

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17. Which element accept one electron and get noble gas like configuration ?

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18. In synthesis of which compound, the water gas is used ?

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19. What is the -O-O-H bond angle in solid form of H_2O_2 ?

View Text Solution

20. The correct reactivity order of halogen with hydrogen is ?

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21. Give reason : The Density of water is higher than density of ice.

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22. Which pairs of ions are responsible for hardness of water ?

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23. Give reason : The hard water is not suitable for washing of clothes.

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Section B Objective Fill In The Blanks

1. H_2O_2 act as a antiseptic then it is known as ..... in market.

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2. The ionic radius of H^+ ions and that of other ions is ..... pm and ..... pm respectively.

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3. ..... group elements give saltlike hydride.

View Text Solution

4. The three dimensional arrangement occurs by ..... bond in ice ?

View Text Solution

5. ..... method is used to obtain H_2O_2 from 2 ethylanthraquinol ?

View Text Solution

6. ..... is the relative proportion of tritium and protium ?

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Section B Objective True Or False

1. The ionization enthalpy of hydrogen is more than Alkali metals.

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2. Some chemical properties of hydrogen is like metal and nonmetal.

View Text Solution

3. At normal temp. dihydrogen react violently with dioxygen.

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Section B Objective Assertion And Reason

1. Assertion : Hydrogen atom is combine with other element by exchange and sharing of electron.

Reason : Hydrogen can be form electrovalent or covalent bond with other elements.

A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) and (R) both are false.

Answer: A

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2. Assertion : H_2 act as a reducing agent and react with many organic compounds in presence of catalyst and give hydrogenated product.

Reason: $CH_2 = CH_2 + H_2 \xrightarrow[390\ \mathrm{K}]{[\mathrm{Ni}]} CH_3 - CH_3$

A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) and (R) both are false.

Answer: A

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3. Assertion : In metallic hydrides hydrogen occupies interstices in the metal lattice producing distortion without any change in its type.

Reason: Metallic hydride is also known as Interstitial hydride.

A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) and (R) both are false.

Answer: B

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4. Assertion : Saline hydrides react violently with water producing dihydrogen gas.

Reason: The metals of group 6, 7, 8 and 9 do not from hydride.

A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) and (R) both are false.

Answer: C

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5. Assertion : H_2O has high melting point and boiling point than H_2S, H_2Se .

Reason: H_2O containing hydrogen bond

A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) and (R) both are false.

Answer: A

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Section C Mcqs

1. Electron configuration of hydrogen is .....

A. $1S^2$

B. $2P^1$

C. $1S^1$

D. $2d^1$

Answer: C

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2. The ionic radius of H^+ ions and that of other ions is ..... pm and ..... pm respectively.

A. $50 - 200, 1.5 \times 10^{-3}$

B. $1.5 \times 10^{-3}, 50 - 100$

C. $10^{-3}, 300$

D. 1.5 , 400

Answer: B

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3. Molecular formula of sodium hexameta phosphate is .....

A. $Na_5P_5O_{10}$

B. $Na_6P_6O_{18}$

C. $Na_6P_5O_{17}$

D. $Na_6P_6O_{17}$

Answer: B

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4. Which is the isotope of dihydrogen ?

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

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

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

D. All

Answer: D

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5. Which particle the tritium emits ?

A. α

B. β^-

C. β^+

D. γ

Answer: B

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6. ..... group elements give saline hydrides.

A. s

B. p

C. d

D. f

Answer: A

View Text Solution

7. ..... hydrides are non-stoichiometric hydride

A. $LaH_{2.87}$

B. $YbH_{2.55}$

C. $VH_{0.56}$

D. All of

Answer: D

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8. Cation exchange resins is a ..... group containing organic molecule.

A. SO_2

B. SO_3H

C. SO_3

D. SO_4^{2-}

Answer: B

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9. How many % of H_2O_2 present in commercially marketed H_2O_2 at STP ?

A. $10\ \%$

B. $20\ \%$

C. $30\ \%$

D. $40\ \%$

Answer: C

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10. How many neutrons are there in nucleus of tritium ?

A. 0

B. 2

C. 3

D. 1

Answer: B

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11. Which catalyst is used for preparation water-gas from methane ?

A. Co

B. Ni

C. Cu_2O

D. Fe_2O_3

Answer: B

View Text Solution

12. What is shape of H_2O molecule ?

A. Linear

B. Angular

C. Triangular

D. planar

Answer: B

View Text Solution

13. Modern periodic, the water gas is known as which gas ?

A. Natural gas

B. Artifical gas

C. Synthesis gas

D. Productive gas

Answer: C

View Text Solution

14. What is the half-life period of tritium ?

A. 12.33 minute

B. 12.33 second

C. 12.33 years

D. 12.33 hour

Answer: C

View Text Solution

15. Crystal structure of ice is detected by .....

A. Microscope

B. X-rays

C. Infrared rays

D. I. R. Spectrum

Answer: B

View Text Solution

16. Which of the following salts are responsible for temporary hardness of water ?

A. $Ca(HCO_3)_2$

B. $Mg(HCO_3)_2$

C. (A) and (B) Both

D. $NaHCO_3$

Answer: C

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17. Because of which bond three dimensional structure is formed in ice ?

A. Covalent bond

B. Hydrogen bond

C. Ionic- bond

D. Metallic bond

Answer: B

View Text Solution

18. What is form when heavy water reacts with CaC_2 ?

A. CaD_2

B. C_2D_2

C. Ca_2D_2O

D. CD_2

Answer: B

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19. ..... % dihydrogen is added in CNG.

A. 1

B. 2

C. 3

D. 4

Answer: D

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20. Sodium hexametaphosphate is known as ..... at commerically.

A. calgon

B. complex

C. leuco

D. caglon

Answer: A

View Text Solution

21. At ..... distance the four oxygen atoms surrounded to each oxygen atom in ice.

A. 2.76×10^{-10} m

B. 2.76 Å

C. 276 pm

D. All of

Answer: D

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22. Which element of group six forms metal hydride ?

A. Na

B. Cr

C. Mn

D. Fe

Answer: B

View Text Solution

23. Which of the following used in CLARK method to remove temporary hardness of water ?

A. Na_2CO_3

B. Sodium hexametaphosphate

C. $Ca(OH)_2$

D. Zeolite

Answer: C

View Text Solution

24. The electric conductivity of ..... Is not equal to that of metals.

A. CrH

B. NaH

C. TiH

D. All (A) , (B) & (C)

Answer: A

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25. The structure of ice is ..... type.

A. Linear

B. Two dimensional

C. Three dimensional

D. Metal like

Answer: C

View Text Solution

26. $N_{2(g)} + 3H_{2(g)} \underset{\text{Fe}}{\overset{200\ \text{Atm}}{\Longleftrightarrow}} 2NH_{3(g)}$, At which temperature this reaction will be possible ?

A. $327^\circ C$

B. 620.6° F

C. 600 K

D. 673 K

Answer: D

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27. Complete the reaction : $8LiH + Al_2Cl_6 \rightarrow$ (?)

A. $LiAlCl_5 + LiCl$

B. $LiAlH_4 + LiCl$

C. $2LiAlH_4 + 6LiCl$

D. $LiAlCl_3 + LiCl_2$

Answer: C

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28. 99.95% dihydrogen is obtained by electrolysing warm aqueous $Ba(OH)_2$ solution by electrodes.....

A. Cu

B. Pt

C. Ni

D. Zn

Answer: C

View Text Solution

29. The industrial dihydrogen is produced ..... from coal.

A. $77\ \%$

B. $18\ \%$

C. $4\ \%$

D. $50\ \%$

Answer: B

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30. ..... undergoes oxidation in the following reaction.

$$Zn_{(s)} + 2NaOH_{(aq)} \rightarrow Na_2ZnO_{2(aq)} + H_{2(g)}$$

A. Zn

B. Na^+

C. OH^-

D. H_2

Answer: A

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31. Hydrogen forms hydride (H^- negative ions) by accepting one electron. This property is similar to .....

A. F

B. Cl

C. Br

D. All (A) , (B) & (C)

Answer: D

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32. ..... is used as moderator in nuclear reactor.

A. H_2O

B. H_2O_2

C. D_2O

D. NH_3

Answer: C

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33. How many total fundamental particles are there in tritium (isotope of hydrogen)?

A. 4

B. 3

C. 5

D. 2

Answer: A

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34. How many types of hidride compound

A. 2

B. 3

C. 4

D. 5

Answer: B

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35. How many nutrons are there in hydrogen ?

A. 0

B. 3

C. 4

D. 5

Answer: A

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36. Ionic hydride contains ..... property.

A. Crystal

B. Solid

C. non-valatile

D. All of these

Answer: D

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37. The half life time of ${}_{1}^{3}H$ is 12.33 years, what is the decay constant ?

A. 12.33 years

B. 0.5620 years^{-1}

C. 0.05620 years^{-1}

D. 0.05620 years^{-1}

Answer: A::C

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38. Calculate the strength of H_2O_2 solution in 10 volume.

A. 36.30 gm

B. 30 gm

C. 30.36 gm

D. 36 gm

Answer: C

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39. The grade of 2.95 M H_2O_2 in volume of percentage is ___ and ___ respectively.

A. 33,10

B. 35,12

C. 28,10

D. 36,12

Answer: A

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40. The solubility of H_2O_2 is 48 gm in 500 ml calculate volume strength and %w/v.

A. 34.62,19.2

B. 31.62,19.2

C. 31.62,9.6

D. 30.2,9.6

Answer: C

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41. The volume of O_2 gas evolved from 40 gram per litre H_2O_2 at STP is.....

A. 22.4

B. 11.2

C. 33.6

D. 13.18

Answer: D

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42. 6L H_2O_2 contains 440 gm solute than how much litre O_2 gas will produce from this solution at STP ?

A. 24.16

B. 22.8

C. 30.16

D. 25.8

Answer: A

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43. Calculate the strength of H_2O_2 solution in 10 volume.

A. 36.30 gm

B. 30 gm

C. 30.36 gm

D. 36 gm

Answer: C

View Text Solution

44. How many grams of H_2O_2 in 1 litre of 1.5 N H_2O_2.

A. 25 gram

B. 25.5 gram

C. 30 gram

D. 8.0 gram

Answer: B

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45. The molarity and % w/v of 40 volume H_2O_2 is ....and .....respectively.

A. 3.57 and 12.14

B. 3.57 and 12.4

C. 35.7 and 1.24

D. 35.7 and 14.1

Answer: A

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46. The lable is .volume. is stiched on one bottle of H_2O_2 then ..... is its strength.

A. $10\ \%$

B. $40\ \%$

C. $8\ \%$

D. $4.55\ \%$

Answer: D

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47. 0.01 mole solution of .10 volume. H_2O_2 is required to convert 0.01 mol PbS into $PbSO_4$?

A. 11.2

B. 22.4

C. 33.6

D. 44.8

Answer: D

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48. .....ml (volume) is required of or 10 volume H_2O_2 of 2N $KMnO_4$ in acidic medium ?

A. 200 ml

B. 100 ml

C. 224 ml

D. 150 ml

Answer: C

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Section C Mcqs Asked In Competitive Exams

1. Hydrogen will not reduce....

A. heated cupric oxide.

B. heated ferric oxide.

C. heated stannic oxide.

D. heated aluminium oxide.

Answer: D

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

A. -1 only

B. zero only

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

D. $+1$ only

Answer: C

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3. The oxidation states of the most electronegative element in the products of the reaction, BaO_2 with dil. H_2SO_4 are.....

A. 0 and -1

B. -1 and -2

C. -2 and 0

D. -2 and +1

Answer: B

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4. 30 volumes H_2O_2 means....

A. 30% H_2O_2

B. 30 cm^3 of the solution contains 1 g of H_2O_2

C. 1 cm^3 of the solution liberates 30 cm^3 of O_2 at STP

D. 30 cm^3 of the solution liberates 30 cm^3 of O_2 at STP

Answer: B

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5. An oxide which gives H_2O_2 on treatment with dilute acid is.....

A. PbO_2

B. Na_2O_2

C. MnO_2

D. TiO_2

Answer: B

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6. Nascent hydrogen consists of.....

A. Hydrogen atoms with excess energy

B. Hydrogen molecules with excess energy

C. Hydrogen ions in the excited state

D. Solvated protons

Answer: B

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7. The oxidation number of O in H_2O_2 is.....

A. -2

B. -1

C. $+1$

D. $+2$

Answer: B

View Text Solution

8. Hydrolysis of one mole of peroxodisulphuric acid produces.....

A. two moles of sulphuric acid.

B. two moles of peroxomonosulphuric acid.

C. one mole of sulphuric acid and one mole of peroxomonosulphuric acid.

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

peroxide.

Answer: C

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9. Which contains both polar and non-polar bonds ?

A. NH_4Cl

B. HCN

C. H_2O_2

D. CH_4

Answer: C

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10. The critical temperature of water is higher than that of O_2 because the H_2O molecule has.....

A. fewer electrons than oxygen.

B. two covalent bonds.

C. V-shape

D. dipole moment.

Answer: D

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11. Among KO_2, AlO_2, BaO_2 and NO_2^+ unpaired electron is present in .....

A. NO_2^+ and BaO_2

B. KO and AlO_2^-

C. KO_2 only

D. BaO_2 only

Answer: C

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12. Which of the following statements is correct for hydrogen ?

A. Hydrogen has same ionization potential as alkali metals

B. H^+ has same electro negativity as halogens

C. H^+ has oxidation number of -1 or +1

D. H^+ is always collected at cathode

Answer: C

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13. What is heavy water ?

A. H_2O^{17}

B. H_2O^{18}

C. H_2O_2

D. D_2O

Answer: D

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14. Acidified solution of chromic acid on treatment with H_2O_2 yields.

A. $CrO_3 + H_2O + O_2$

B. $Cr_2O_3 + H_2O + O_2$

C. $CrO_5 + H_2O$

D. $H_2O_7 + H_2O + O_2$

Answer: C

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15. Amongst H_2O, H_2S, H_2Se and H_2Te the one with the highest boiling point is.....

A. H_2O because of hydrogen bonding.

B. H_2Te because of higher molecular weight.

C. H_2Se because of hydrogen bonding

D. H_2Se because of lower molecular weight.

Answer: A

View Text Solution

16. Fenton.s reagent is...

A. $FeSO_4 + H_2O_2$

B. Zn+HCl

C. Sn+HCl

D. None of these

Answer: A

View Text Solution

17. Ortho and parahydrogen differ in...

A. atomic number

B. atomic mass

C. spins of protons

D. number of neutrons

Answer: C

View Text Solution

18. Heavy water is obtained by....

A. boiling water.

B. fractional distillation of H_2O

C. prolonged electrolysis of H_2O

D. heating H_2O_2

Answer: C

View Text Solution

19. Ortho and para hydrogen differ in....

A. Proton spin

B. Electron spin

C. Nuclear charge

D. Nuclear reaction

Answer: A

View Text Solution

20. Polyphosphates are used as water softening agents because they.....

A. form soluble complex with anionic species

B. precipitate anionic species

C. form soluble complex with cationic species

D. precipitate cationic species

Answer: C

View Text Solution

21. Action of water or dilute mineral acids on metals can give.....

A. Mono hydrogen

B. Tritium

C. Di hydrogen

D. Trihydrogen

Answer: C

View Text Solution

22. Which of the following reaction produces hydrogen

A. $Mg + H_2O$

B. $BaO_2 + HCl$

C. $H_2S_4O_8 + H_2O$

D. $Na_2O_2 + 2HCl$

Answer: A

View Text Solution

23. Which of the following pair of ions makes the water hard

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

B. K^+, HCO_3^-

C. Ca^{2+}, NO_3^-

D. NH_4^+, Cl^-

Answer: B

View Text Solution

24. On reaction with Mg, very dilute nitric acid produces

A. NH_3

B. Nitrous oxide

C. Nitric oxide

D. Hydrogen

Answer: D

View Text Solution

25. Which of the following gas is insoluble in water ?

A. SO_2

B. NH_3

C. H_2

D. CO_2

Answer: C

View Text Solution

26. In lab H_2O_2 is prepared by .....

A. Cold $H_2SO_4 + BaO_2$

B. HCl+ BaO_2

C. Conc. $H_2SO_4 + Na_2O_2$

D. $H_2 + O_2$

Answer: A

View Text Solution

27. 20 volume H_2O_2 Solution has a strength of about

A. $30\ \%$

B. $6\ \%$

C. 3%

D. 10%

Answer: B

View Text Solution

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

A. Copper

B. Iron

C. Lead

D. Mercury

Answer: B

View Text Solution

29. Heavy water is .....

A. Water containing Fe, Cr, Mn

B. Water at $0^{\circ} C$

C. D_2O

D. H_2O^{18}

Answer: C

View Text Solution

30. Ozone is used for purifying water because....

A. it dissociates and release oxygen.

B. do not leave any foul smell like chlorine.

C. kills bacteria .cyst' fungi and acts as a biocide.

D. all of the above

Answer: D

View Text Solution

Section C Mcqs Asked In Board Exams

1. Select the correct choice for given statements. T for true and F - for false

(i) The physical properties of hydrogen are like those of metals.

(ii) Some chemical properties of hydrogen are those of metals and of non-metals.

(iii) Metals of groups 7, 8 and 9 form nonstoichiometric hydrides.

(iv) The percentage of water in natural sources like rivers is 2.04.

A. i-F,ii-T,iii-F,iv-F

B. i-T,ii-T,iii-T,iv-F

C. i-T,ii-F,iii-F,iv-F

D. i-F,ii-T,iii-F,iv-T

Answer: A

View Text Solution

2. The relative proportion of the atoms of tritium and protium is :

A. $10:10^{17}$

B. $1:10^{17}$

C. $10:10^{-7}$

D. $1:10^{7}$

Answer: B

View Text Solution

3. Dihydrogen gas is obtained by using, which reactant ?

A. $Cl_2 + NaOH_{(aq)}$

B. $CH_4 + O_2$

C. $Zn + ZnCl_2$

D. $Zn + NaOH_{(aq)}$

Answer: D

View Text Solution

4. Which of the group given below is most appropriate for the hydride compounds ?

A. s-block - Metallic hydride - TiH_2

B. p-block - Molecular hydride -CH_4

C. d-block - Metallic hydride - BeH_2

D. f-block Ionic hydride -TiH_2

Answer: B

View Text Solution

5. In the reaction : $2H_2O_2 \rightarrow 2H_2O + O_2$

A. H_2O_2 undergoes only oxidation.

B. H_2O_2 undergoes both oxidation and reduction.

C. H_2O_2 undergoes neither oxidation nor reduction.

D. H_2O_2 undergoes only oxidation.

Answer: B

View Text Solution

6. $H_3S - O - O - SO_3H_{(aq)} \xrightarrow[H_2O]{\text{hydrolysis}} 2H_2SO_4 + X$

The product X is .....

A. SO_2

B. H_2O_2

C. SO_3

D. O_2

Answer: B

View Text Solution

7. The empirical formula of Marshal.s acid and .calgon. are respectively :

A. H_2SO_6, Na_2PO_4

B. HSO_4, Na_2PO_3

C. H_2SO_5, $NaPO_5$

D. HSO_4, $NaPO_3$

Answer: C

View Text Solution

8. What does the resulting solution contain when ammonia gas reacts with water ?

A. NH_2, H_3O^+

B. NH_4^+, OH^-

C. NH_4^+, NO_3^-

D. N_2H_4, NO_3^-

Answer: B

View Text Solution

9. Molarity and Normality of 20 volume H_2O_2 solution is

A. 0.892 M, 3.57 M

B. 1.787 M , 3.57 N

C. 0.892 M, 1.785 N

D. 3.57 M, 1.787 N

Answer: B

View Text Solution

10. Which pair of species are formed when hydrogen peroxide is react with suspension of PbS ?

A. $PbO + SO_2 + H_2O$

B. $PbSO_4 + H_2O$

C. $PbSO_3 + H_2O$

D. $Pb + SO_2 + H_2O$

Answer: B

View Text Solution

11. What is the strength of H_2O_2 solution whose volume is 12 ?

A. 31.20

B. 36.42

C. 31.34

D. 33.44

Answer: B

View Text Solution

12. Which of the following compound is used to increase stability of hydrogen peroxide ?

A. Sulphuric acid

B. Phosphorous acid

C. Sulphurous acid

D. Phosphoric acid

Answer: D

View Text Solution

13. Which substance is known as .Calgon. ?

A. $Na_6P_4O_{18}$

B. $Na_6P_6O_{18}$

C. $Na_4P_4O_{16}$

D. $Na_6P_6O_{16}$

Answer: B

View Text Solution

14. The maximum production of hydrogen is obtain from

A. Metal react with acid

B. Petrochemicals

C. By coal

D. By electrolysis

Answer: B

View Text Solution

15. Which statement is proper for water ?

A. Volume of H_2O is smaller than hydride of 16th group elements.

B. It.s solid state is tetrahedral.

C. It.s concentration is 55.55M having amphoteric nature.

D. Above all are correct.

Answer: D

View Text Solution

16. Which of following is Isotopes of Hydrogen ?

A. $._1 H^0$

B. $._1 D^2$

C. $._1 T^2$

D. $._3 T^1$

Answer: B

View Text Solution

17. Which elements does not give Hydride ?

A. Te

B. Ti

C. Tl

D. Th

Answer: C

View Text Solution

18. Which substance is called as a calgon for business purpose ?

A. Sodium pyrometa phosphate

B. Sodium meta phosphate

C. Sodium poly meta phosphate

D. Sodium Hexa meta phosphate

Answer: D

View Text Solution

19. Classification of hydride according to Lewis structure is .....

A. LiH

B. CaH_2

C. NH_3

D. NbH_2

Answer: C

View Text Solution

20. What is the grade of H_2O_2 whose concentration is 3.125m for selling in open market ?

A. 30

B. 35

C. 40

D. 25

Answer: B

View Text Solution

21. Give molarity and strength % w/v accordingly in 30 volume of H_2O_2 solution.

A. 2.678 M, 18.22%

B. 2.678 M, 9.11%

C. 5.356 M, 9.11%

D. 5.356 M, 18.22%

Answer: A

View Text Solution

22. Which of the following products is obtain when ethene react with hydrogen in presence of raney nikel at 390 K ?

A. Ethane

B. Ethanal

C. Ethane 1, 2-diol

D. Ethanol

Answer: A

View Text Solution

23. Which of the following is used in Ion Exchange method as a Ion Exchanger ?

A. Alum

B. Zeolite

C. Calgon

D. Flake Lime

Answer: B

View Text Solution

24. $CH_3OH_{(l)} \xrightarrow[673\ \text{K}]{50\ \text{bar}} CO_{(g)} + 2H_{2(g)}$

Which catalyst is used in the above reaction.

A. Copper oxide

B. Iron chromate

C. Cuprous oxide

D. Nickel

Answer: C

View Text Solution

25. The concentration of OH^- in water at 298 K

A. 10^{-14}

B. 55.55

C. 10^{-7}

D. All of these

Answer: C

View Text Solution

26. When zinc pieces are added to concentrated NaOH solution, $H_{2(g)}$ is formed along with

A. Na_3ZnO_2

B. Na_2ZnO_2

C. Na_4ZnO_2

D. Na_2ZnO_3

Answer: B

View Text Solution

27. Which of the following compound is used to understand the reaction mechanism and exchange of ions ?

A. H_2O

B. D_2O

C. H_2O_2

D. H_2

Answer: B

View Text Solution

28. Assertion: The relative proportion of Tritium and Protium is $1:10^{17}$

Reason: The property responsible for the low proportion of Tritium is its non-radioactivity.

A. Both assertion and reason are true.

B. Both assertion and reason are true and reason is the correct explanation of the assertion.

C. Assertion is false but reason is true.

D. Assertion is true but reason is false.

Answer: D

View Text Solution

29. Which of the statement given below are correct ?

(i) Pure dihydrogen 99.5 % is obtained by heating hydrocarbons at 1270 K temperature using Fe catalyst.

(ii) In acidic medium H_2O_2 decolourises potassium permanganate solution.

(iii) Ca^{2+} and Mg^{2+} ions can be precipitated by calgon to soften the hard water

(iv) The strength of 15 volume H_2O_2 at STP is 45.54 gram.

A. (i),(ii)

B. (ii),(iv)

C. (ii),(iii),(iv)

D. (i),(iii),(iv)

Answer: C

View Text Solution

30. Among the elements In, Ti, TI and Ca which element do not form hydride ?

A. In, Tl

B. In, Tl,Ca

C. In,Ca

D. In,Ti

Answer: A

View Text Solution

31. What is the -O-O-H bond angle in solid form of H_2O_2 ?

A. 94.8°

B. 111.5°

C. 92.2°

D. 101.9°

Answer: D

View Text Solution

32. Dihydrogen and alkli metals resemble in which of the following properties ?

A. Both are powerful oxidising agents

B. Both have low ionization enthalpy

C. Both are diatomic

D. Both are powerful reducing agents

Answer: D

View Text Solution

33. Which ion is displaced by Na^+ ions when hard water is passed over Zeolite ?

A. OH^-

B. Ca^{2+}

C. K^+

D. H^+

Answer: B

View Text Solution

34. What is added as stabilizer to aqueous solution of H_2O_2 ?

A. Phosphoric acid

B. Phosphonic acid

C. Pyrophosphoric acid

D. Phosphorous acid

Answer: A

View Text Solution

35. Choose the correct option. T stands for True and F stands for False.

(i) Tritium can be obtained from natural sources.

(ii) In ionic hydride, the oxidation state of hydrogen is +1.

(iii) The four atoms of oxygen in H_2O_2 are in the same plane.

(iv) Na_2Co_3 removes temporary and permanent hardness of water.

A. TFFF

B. TFFT

C. TTTF

D. TFTT

Answer: A

View Text Solution

36. Which of the following is correct matching of column-A with column-B:

A. i-q , ii- p , iii-r , iv-s

B. i-q, ii-p , iii-s , iv-s,q

C. i-s , ii-r , iii-p , iv-q

D. i-q, ii-p,r , iii-s , iv-p,r

Answer: D

View Text Solution

Section C Mcqs Asked In Jee Neet Aieee

1. The O-O-H bond angle in H_2O_2 is .....

A. 106°

B. $109^\circ 28.$

C. 120°

D. 98.8°

Answer: D

View Text Solution

2. The high density of water as compared to ice is due to .....

A. Hydrogen bonding interactions

B. Dipole-dipole interactions

C. Dipole-induced dipole interactions

D. Induced dipole induced dipole interactions

Answer: A

View Text Solution

3. The volume strength of 1.5 N H_2O_2 solution is .....

A. 4.8

B. 5.2

C. 8.8

D. 8.4

Answer: D

View Text Solution

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

A. $H^-_{(aq)} + H_2O_{(l)} \rightarrow H_3O^+_{(aq)}$

B. $H^-_{(aq)} + H_2O_{(l)} \rightarrow OH^-_{(aq)} + H_{2(g)}$

C. $H + H_2O \rightarrow$ No reaction

D. None of these

Answer: B

View Text Solution

View Text Solution

5. When a substance reacts with water, it produces a combustible gas B and a solution of substance C in water. When another substance D reacts with this solution of C, it produces the same gas B on warming but D can produces gas B on reaction with dilute sulphuric acid at room temperature. A imparts a deep golden yellow color to a smokeless flame of Bunsen burner. A, B, C and D respectively are.....

A. $Na, H_2, NaOH, Zn$

B. K, H_2, KOH, Al

C. $Ca, H_2, Ca(OH)_2, Sn$

D. $CaC_2, C_2H_2, Ca(OH)_2, Fe$

Answer: A

View Text Solution

6. Which of the following pairs of substances on reaction will not evolve H_2 gas ?

A. Fe and H_2SO_4 (aqeous)

B. copper and HCI (aqueous)

C. sodium and ethyl alcohol

D. iron and steam

Answer: B

View Text Solution

7. The structure of H_2O_2 is .....

A. planar

B. non-planar

C. spherical

D. linear

Answer: B

View Text Solution

8. The metallic Na dissolves in liquid ammonia to form a deep blue colour is due to formation of .....

A. Solvated electron, $e(NH_3)_x^-$

B. Solvated atomic sodium , Na $(NH_3)_y$

C. $\left(Na^+ - Na^-\right)$

D. $NaNH_2 + H_2$

Answer: A

View Text Solution

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

A. Saturation of Na_2SO_4 to water

B. Saturation of water with $CaCO_3$

C. Saturation of water with $MgCO_3$

D. Saturation of water with $CaSO_4$

Answer: D

View Text Solution

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

A. Saturation of water with $CaCO_3$

B. Saturation of water with $MgCO_3$

C. Saturation of water with $CaSO_4$

D. Addition of Na_2SO_4 to water

Answer: C

View Text Solution

11. Commercial 11.2 volume H_2O_2 solution has a molarity of.....

A. 1.0

B. 0.5

C. 11.2

D. 0.75

Answer: A

View Text Solution

12. Based on the lattice energy and other consideraction which one of the following alkali metal chloride is expected to have the highest melting point.

A. LiCl

B. NaCl

C. KCl

D. RbCl

Answer: B

View Text Solution

13. 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 removed by absorption in aqueous $CaCl_2$ solution.

B. H_2 is removed through occlusion with Pd

C. CO is oxidised to CO_2 with steam in the presence of a catalyst followed by absorption of CO_2 in alkli.

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

Answer: C

View Text Solution

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

A. reaction of methane with steam.

B. mixing natural hydrocarbons of high molecular weight.

C. electrolysis of water.

D. reaction of salts like hydrides with water.

Answer: D

View Text Solution

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

(i)$H_2O_2 + 2H^+ + 2\bar{e} \rightarrow 2H_2O$

(ii)$H_2O_2 - 2\bar{e} \rightarrow O_2 + 2H^+$

(iii) $H_2O_2 + 2\bar{e} \rightarrow 2OH^-$

(iv)$H_2O_2 + 2OH^- - 2\bar{e} \rightarrow O_2 + 2H_2O$

A. (iii),(iv)

B. (i),(iii)

C. (ii),(iv)

D. (i),(ii)

Answer: C

View Text Solution

16. The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives :

A. Mn^{4+} and O_2

B. Mn^{2+} and O_2

C. Mn^{2+} and O_3

D. Mn^{4+} and MnO_2

Answer: B

View Text Solution

17. Find one wrong statement regarding H_2O_2

A. It acts only as an oxidising reagent.

B. It decomposes in presence of light.

C. It is stored in dark plastic or wax coated bottle.

D. It is kept away from dust.

Answer: A

View Text Solution

18. Which one of the following statements about water is FALSE ?

A. Ice formed by heavy water sinks in normal water.

B. Water is oxidized to oxygen during photo synthesis.

C. Water can act both as an acid and as a base.

D. There is extensive intramolecular hydrogen bonding in the condensed phase.

Answer: D

View Text Solution

19. In the following reactions, ZnO is respectively acting as a/an .....

(a) $ZnO + Na_2O \rightarrow Na_2ZnO_2$

(b) $ZnO + CO_2 \rightarrow ZnCO_3$

A. base and acid

B. base and base

C. acid and base

D. acid and base

Answer: D

View Text Solution

20. Hydrogen peroxide oxidises $\left[Fe(CN)_6\right]^{4-}$ to $\left[Fe(CN)_6\right]^{3-}$ in acidic medium but reduces $\left[Fe(CN)_6\right]^{3-}$ to $\left[Fe(CN)_6\right]^{4-}$

in alkaline medium. The other products formed are, respectively.

A. $(H_2O + O_2)$ and H_2O

B. $(H_2O + O_2)$ and $\left(H_2O + OH^-\right)$

C. H_2O and $(H_2O + O_2)$

D. H_2O and $\left(H_2O + OH^-\right)$

Answer: C

View Text Solution

21. The isotopes of hydrogen are....

A. Tritium and protium only

B. Deuterium and tritium only

C. Protium and deuterium only

D. Protium, deuterium and tritium

Answer: D

View Text Solution

22. The method used to remove temporaty hardness of water is :

A. Synthetic resins method

B. Calgon.s method

C. Clark.s method

D. Ion-exchange method

Answer: C

View Text Solution

23. In comparison to the zeolite process for the removal of permanent hardness, the synthetic resins method is:

A. Less efficient as it exchanges only anions.

B. More efficient as it can exchanges only cations.

C. Less efficient as the resins cannot be generated.

D. More efficient as it can exchange both cations and anions.

Answer: D

View Text Solution

Section D Ncert Exemplar Mcqs

1. 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. Its tendency to lose an electron to form a cation.

B. Its tendency to gain a single electron in its valence shell to attain stable electronic configuration

C. Its low negative electron enthalpy value

D. Its small size

Answer: B

View Text Solution

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

A. Ionisation enthalpy of hydrogen resembles that of alkali metals.

B. Its reactivity is similar to halogens

C. It resembles both alkali metals and halogens

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

Answer: D

View Text Solution

3. Metal hydrides are ionic, covalent or molecular in nature. Among LiH, NaH, KH, RbH and 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

View Text Solution

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

A. B_2H_6

B. NH_3

C. H_2O

D. CH_4

Answer: D

View Text Solution

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

A. Protium

B. deuterium

C. tritium

D. hydronium

Answer: C

View Text Solution

6. Consider the reactions

(i) $H_2O_2 + 2HI \rightarrow I_2 + 2H_2O$

(ii) $HOCl + H_2O_2 \rightarrow H_3O^+ + Cl^- + O_2$

Which of the following statements is correct about H_2O_2 with reference to these reactions ? Hydrogen peroxide is .....

A. an oxidising agent in both (i) and (ii)

B. an oxidising agent in (i) and reducing agent in (ii)

C. a reducing agent in (i) and oxidising agent in (ii)

D. a reducing agent in both (i) and (ii)

Answer: B

View Text Solution

7. The oxide that gives H_2O_2 on treatment with dilute H_2SO_4 is

A. PbO_2

B. $BaO_2.8H_2O + O_2$

C. MnO_2

D. TiO_2

Answer: B

View Text Solution

8. Which of the following equations depict the oxidising nature of H_2O_2?

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

B. $2Fe^{3+} + 2H + H_2O_2 \rightarrow 2Fe^{2+} + 2H_2O + O_2$

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

D. $KIO_4 + H_2O_2 \rightarrow KIO_3 + H_2O + O_2$

Answer: C

View Text Solution

9. Which of the following equation depicts reducing nature of H_2O_2 ?

A.

$$2\left[Fe(CN)_6\right]^{4-} + 2H^+ + H_2O_2 \rightarrow 2\left[Fe(CN)_6\right]^{3-} + 2H_2O$$

B. $I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$

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

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

Answer: B

View Text Solution

10. Hydrogen peroxide is .....

A. an oxidising agent

B. a reducing agent

C. both an oxidising and a reducing agent

D. neither oxidising nor reducing agent

Answer: C

View Text Solution

11. Which of the following reactions increases production of dihydrogen from synthesis gas ?

A. $CH_{4(g)} + H_2O_{(g)} \xrightarrow[\text{Ni}]{1270\ \text{K}} CO_{(g)} + 3H_{2(g)}$

B. $C_{(s)} + H_2O_{(g)} \xrightarrow{1270\ \text{K}} CO_{(g)} + H_{2(g)}$

C. $CO_{(g)} + H_2O_{(g)} \xrightarrow[\text{Catalyst}]{673\ \text{K}} CO_{2(g)} + H_{2(g)}$

D. $C_2H_6 + 2H_2O \xrightarrow[\text{Ni}]{1270\ \text{K}} 2CO + 5H_2$

Answer: C

View Text Solution

12. When sodium peroxide is treated with dilute sulphuric acid, we get .....

A. sodium sulphate and water

B. sodium sulphate and oxygen

C. sodium sulphate hydrogen and oxygen

D. sodium sulphate and hydrogen peroxide

Answer: D

View Text Solution

13. Hydrogen peroxide is obtained by the electrolysis of .....

A. water

B. sulphuric acid

C. hydrochloric acid

D. fused sodium peroxide

Answer: B

View Text Solution

14. Which of the following reactions is an example of use of water gas in the synthesis of other compounds ?

A. $CH_{4(g)} + H_2O_{(g)} \xrightarrow[\text{Ni}]{1270\ \text{K}} CO_{(g)} + H_{2(g)}$

B. $CO_{(g)} + H_2O_{(g)} \xrightarrow[\text{Catalyst}]{673\ \text{K}} CO_{2(g)} + H_{2(g)}$

C. $C_nH_{2n} + nH_2O_{(g)} \xrightarrow[\text{Ni}]{1270\ \text{K}} nCO + (2n+1)H_2$

D. $CO_{(g)} + 2H_{2(g)} \xrightarrow{[CO]} CH_3OH_{(l)}$

Answer: D

View Text Solution

15. Which of the following ions wilt cause hardness in water sample ?

A. Ca^{+2}

B. Na^{+}

C. Cl^{-}

D. K^{+}

Answer: A

View Text Solution

16. Which of the following compounds is used for water softening ?

A. $Ca_3(PO_4)_2$

B. Na_3PO_4

C. $Na_6P_6O_{18}$

D. Na_2HPO_4

Answer: C

View Text Solution

17. Elements of which of the following group(s) of periodic table do not form hydrides ?

A. Groups 7, 8, 9

B. Groups 13

C. Groups 15, 16, 17

D. Groups 14

Answer: A

View Text Solution

18. Only one element of ..... forms hydride.

A. group-6

B. group-7

C. group-8

D. group-9

Answer: A

View Text Solution

Section D Ncert Exemplar Mcqs More Than One Correct Answer

1. Which of the following statements are not true for hydrogen ?

A. It exists as diatomic molecule

B. It has one electron in the outermost shell

C. It can lose an electron to form a cation which can freely exist

D. It forms a large number of ionic compounds by losing an electron.

Answer: C::D

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2. Dihydrogen can be prepared on commercial scale by different methods. In its preparation by the action of steam on hydrocarbons, a mixture of CO and H_2 gas is formed. It is known as .....

A. water gas

B. syn gas

C. producer gas

D. industrial gas

Answer: A::B

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3. Which of the following statement(s) is/are correct in the case of heavy water ?

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

B. Heavy water is more effective as solvent than ordinary water.

C. Heavy water is more associated than ordinary water.

D. Heavy water has lower boiling point than ordinary water.

Answer: A::C

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4. Which of the following statements about hydrogen are correct ?

A. Hydrogen has three isotopes of which protium is the most common.

B. Hydrogen never acts as cation in ionic salts

C. Hydrogen ion, H^+, exists freely in solution.

D. Dihydrogen does not act as a reducing agent

Answer: A::B

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5. Some of the properties of water are described below. Which of them is/are not correct ?

A. Water is known to be a universal solvent

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

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

D. Frozen water is heavier than liquid water.

Answer: C::D

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6. Hardness of water may be temporary or permanent. Permanent hardness is due to the presence of

A. chlorides of Ca and Mg in water

B. sulphates of Ca and Mg in water

C. hydrogen carbonates of Ca and Mg in water

D. carbonates of alkali metals in water

Answer: A::B

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7. Which of the following statements is correct ?

A. Elements of group 15 form electron deficient hydrides.

B. All elements of group 14 form electron precise hydrides.

C. Electron precise hydrides have tetrahedral geometries.

D. Electron rich hydrides can act as Lewis acids.

Answer: B::C

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8. Which of the following statements is correct ?

A. Hydrides of group 13 act as Lewis acids.

B. Hydrides of group 14 are electron deficient hydrides.

C. Hydrides of group 14 act as Lewis acids.

D. Hydrides of group 15 act as Lewis bases.

Answer: A::D

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9. Which of the following statements is correct?

A. Metallic hydrides are deficient of hydrogen.

B. Metallic hydrides conduct heat and electricity

C. Ionic hydrides do not conduct electricity in solid state.

D. Ionic hydrides are very good conductors of electricity in solid state.

Answer: A::B::C

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Section D Ncert Exemplar Short Answer

1. How can production of hydrogen from water gas be increased by using water gas shift reaction ?

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2. What are metallic/interstitial hydrides ? How do they differ from molecular hydrides ?

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3. Name the classes of hydrides to which H_2O, B_2H_6 and NaH belong

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4. If same mass of liquid water and a piece of ice is taken, then why is the density of ice less than that of liquid water ?

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5. Complete the following equations:

(i) $PbS_{(s)} + H_2O_{2(aq)} \rightarrow$

(ii) $CO_{(g)} + 2H_{2(g)} \xrightarrow[\text{Catalyst}]{\text{Cobalt}}$

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6. Give reasons.

(i) Lakes freeze from top towards bottom

(ii) Ice floats on water.

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7. What do you understand by the term .auto protolysis. of water? What is its significance ?

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8. Discuss briefly de-mineralisation of water by ion exchange resin.

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9. Molecular hydrides are classified as electron deficient, electron precise and electron rich compounds. Explain each type with two examples.

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10. How is heavy water prepared ? Compare its physical properties with those of ordinary water.

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11. Write one chemical reaction for the preparation of D_2O_2

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12. Calculate the strength of 5 volumes H_2O_2 solution.

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13. (i)Draw the gas phase and solid phase structure of H_2O_2

(ii) H_2O_2 is a better oxidising agent than water. Explain.

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14. Melting point, enthalpy of vaporisation and viscosity data of H_2O and D_2O is given below.

On the basis of this data explain in which of these liquids intermolecular forces are stronger ?

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15. Dihydrogen reacts with dioxygen (O_2) to form water. Write the name and formula of the product when the isotope of hydrogen which has one proton and one neutron in its nucleus is treated with oxygen. Will the reactivity of both the isotopes be the same towards oxygen ? Justify your answer.

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16. Explain why HCl is a gas and HF is a Liquid ?

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17. When the first element of the periodic table is treated with dioxygen, it gives a compound whose solid state floats on its liquid state. This compound has an ability to act as an acid as

well as a base. What products will, be formed when this compound undergoes autoionisation ?

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18. Roshan heard that instructions were given to the laboratory attendant to store a particular chemical, i.e. keep it in the dark room, add some urea in it, and keep it away from dust. This chemical acts as an oxidising as well as a reducing agent in both acidic and alkaline media. This chemical is important for use in the pollution control treatment of domestic and industrial effluents.

(i) Write the name of this compound.

(ii) Explain why such precautions are taken for storing this chemical.

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19. Give reasons why hydrogen resembles alkali metals ?

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20. Hydrogen generally forms covalent compounds. Give reason.

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21. Why is the ionisation enthalpy of hydrogen higher than that of sodium ?

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22. Basic principle of hydrogen economy is transportation and storage of energy in the form of liquid or gaseous hydrogen.

Which property of hydrogen may be useful for this purpose ? Support your answer with the chemical equation if required.

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23. What is the importance of heavy water ?

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24. Write the Lewis structure of hydrogen peroxide.

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25. An acidic solution of hydrogen peroxide behaves as an oxidising as well as reducing agent. Illustrate it with the help of a chemical equation.

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26. With the help of suitable examples, explain the property of H_2O_2 that is responsible for its bleaching action ?

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27. Why is water molecule polar ?

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28. Why does water show high boiling point as compared to hydrogen sulphide ? Give reasons for your answer.

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29. Why can dilute solutions of hydrogen peroxide not be concentrated by heating ? How can a concentrated solution of hydrogen peroxide be obtained ?

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30. Why is hydrogen peroxide stored in wax lined bottles ?

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31. Why does hard water not form lather with soap ?

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32. Phosphoric acid is preferred over sulphuric acid in preparing hydrogen peroxide from peroxides. Why ?

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33. How will your account for 104.5° bond angle in water ?

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34. Write redox reaction between fluorine and water.

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35. Write two reactions to explain amphoteric nature of water.

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36. Assertion (A): Permanent hardness of water is removed by treatment with washing soda.

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

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

B. (A) is correct but (R) is not correct

C. (A) and R both are correct but (R) is not the correct explanation of (A)

D. (A) and (R) both are false

Answer: A

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37. Assertion (A): Some metals like platinum and palladium, can be used as storage media for hydrogen.

Reason (R): Platinum and palladium can absorb large volumes of hydrogen.

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

B. (A) is correct but (R) is not correct

C. (A) and R both are correct but (R) is not the correct explanation of (A)

D. (A) and (R) both are false

Answer: A

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Section D Ncert Exemplar Long Answer

1. Atomic hydrogen combines with almost all elements but molecular hydrogen does not. Explain.

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2. How can D_2O be prepared from water ? Mention the physical properties in which D_2O differs from H_2O. Give at least three reactions of D_2O showing the exchange of hydrogen with deuterium.

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3. How will you concentrate H_2O_2 ? Show differences between structures of H_2O_2 and H_2O_2 by drawing their spatial

structures. Also mention three important uses of H_2O_2

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4. (i) Give a method for the manufacture of hydrogen peroxide and explain the reactions involved therein.

(ii) Illustrate oxidising, reducing and acidic properties of hydrogen peroxide with equations.

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5. (i)What mass of hydrogen peroxide will be present in 2 L of a 5 molar solution ?

(ii) Calculate the mass of oxygen which will be liberated by the decomposition of 200 ml of this solution.

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6. A colourless liquid .A. contains H and o elements only. It decomposes slowly on exposure to light. It is stabilised by mixing urea to store in the presence of light.

(i) Suggest possible structure of A.

(ii) Write chemical equations for decomposition reaction in light.

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7. An ionic hydride of an alkali metal has significant covalent character and is almost unreactive towards oxygen and chlorine. This is used in the synthesis of other useful hydrides. Write the formula of this hydride. Write its reaction with Al_2Cl_6.

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8. Sodium forms a crystalline ionic solid with dihydrogen. The solid is non-volatile and non conducting in nature. It reacts violently with water to produce dihydrogen gas. Write the formula of this compound and its reaction with water. What will happen on electrolysis of the melt of this solid.

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