**ACTIVE SITE TUTORIALS**

**Date :** 23-07-2019 **TEST ID: 142**

**Time :** 04:44:00 **CHEMISTRY**

**Marks :** 1136

 9.HYDROGEN

**Single Correct Answer Type**

| 1. | The percentage of para hydrogen in ordinary hydrogen increases when: |
|  | a) | Temperature is lowered |
|  | b) | Temperature is increased  |
|  | c) | Pressure is increased and temperature is decreased. |
|  | d) | None of the above  |
| 2. | Manufacture of is made by: |
|  | a) | Lane’s process | b) | Bosch process | c) | From natural gas | d) | All of these |
| 3. |  on treatment with chlorine gives: |
|  | a) |  | b) | Oxygen  | c) |  | d) |  |
| 4. | Radioactive isotope of hydrogen is  |
|  | a) | Tritium | b) | Deuterium | c) |  hydrogen | d) |  *hydrogen* |
| 5. |  is of the order of  |
|  | a) |  | b) |  | c) |  | d) |  |
| 6. | The hardness of water is estimated by |
|  | a) | EDTA method  | b) | Titrimetic method  | c) | Conductivity method | d) | Distillation method |
| 7. | The bond angle in is |
|  | a) |  | b) |  | c) |  | d) |  |
| 8. | Hydrogen loses its electron to form ion. In this respect it resembles to: |
|  | a) | Transition metals | b) | Alkali metals | c) | Halogens | d) | Noble gases  |
| 9. |  |
|  | a) | Ionic hydride  | b) | Covalent hydride | c) | Metallic hydride  | d) | Polymeric hydride  |
| 10. | The decomposition of can be slowed down by the addition of small amount of phosphoric acid which acts as: |
|  | a) | Stopper  | b) | Detainer | c) | Inhibitor  | d) | promoter |
| 11. | The ortho and para hydrogen possess: |
|  | a) | Same physical properties but different chemical properties |
|  | b) | Different physical properties but same chemical properties |
|  | c) | Same chemical and physical properties |
|  | d) | Different, physical and chemical properties |
| 12. | The volume strength of solution is  |
|  | a) | 4.8 | b) | 8.4 | c) | 4.2 | d) | 2.4 |
| 13. | Which of the following is correct about heavy water? |
|  | a) | Water at 4 having maximum density is known as heavy water |
|  | b) | It is heavier than water |
|  | c) | It is formed by the combination of heavier isotope of hydrogen and oxygen |
|  | d) | None of the above |
| 14. | Which is not present in clear hard water? |
|  | a) |  | b) |  | c) |  | d) |  |
| 15. | Which of the following is not correct regarding the electrolytic preparation of  |
|  | a) | Lead is used as cathode  | b) | 50% is used  |
|  | c) | Hydrogen is liberated at anode | d) | Sulphuric acid undergoes oxidation  |
| 16. | Electrolysis of gives at anode. Vacuum distillation of gives The number of peroxy (O - O) bonds present in respectively are |
|  | a) | 1.1 | b) | 1.2 | c) | Zero, 1 | d) | Zero, zero |
| 17. |  |
|  | a) |  |
|  | b) | Electrons are lost by  |
|  | c) | There is no loss or gain of electrons |
|  | d) | Iron hydroxide precipitates  |
| 18. | Which of the following reactions produces hydrogen? |
|  | a) |  | b) |  | c) |  | d) |  |
| 19. |  is formed by which of the following compounds? |
|  | a) |  | b) |  | c) |  | d) |  |
| 20. | Which of the following acts as both reducing and oxidising agents?  |
|  | a) |  | b) |  | c) | KOH | d) |  |
| 21. | The sum of protons, electrons and neutrons in the heaviest isotope of hydrogen is |
|  | a) | 3 | b) | 5 | c) | 4 | d) | 6 |
| 22. | On shaking with acidified potassium dichromate and ether, ethereal layer becomes  |
|  | a) | Green | b) | Red | c) | Blue | d) | Brown  |
| 23. |   |
|  | a) |  | b) |  | c) |  | d) |  |
| 24. | Hydrogen does not combine with |
|  | a) | Helium | b) | Bismuth | c) | Antimony | d) | Sodium |
| 25. |  |
|  | a) |  | b) | Ca | c) |  | d) | S |
| 26. |  |
|  | a) | Equally in both  | b) |  | c) |  | d) |  |
| 27. | What is formed when calcium carbide react with heavy water? |
|  | a) |  | b) |  | c) |  | d) |  |
| 28. | When different metals like Zn, Sn, Fe are added to dilute sulphuric acid, same gas, which burns explosively in air, is evolved. The gas is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 29. | Heavy water is represented as |
|  | a) |  | b) |  | c) |  | d) |  |
| 30. | Which is not a water softener? |
|  | a) | Calgon  | b) | Permutit | c) |  | d) |  |
| 31. | The boiling point of heavy water is: |
|  | a) | 100 | b) | 101.4 | c) | 104 | d) | 102.5 |
| 32. | The volume of oxygen liberated from 15mL of 20 volume is  |
|  | a) | 250mL | b) | 300mL | c) | 150mL | d) | 200mL |
| 33. | Decomposition of is prevented by |
|  | a) | KOH | b) |  | c) | Acetanilide  | d) | Oxalic acid  |
| 34. | The boiling point of water is high because |
|  | a) | Water molecule is linear |
|  | b) | Water molecule is not linear |
|  | c) | Water molecules possess covalent bond between H and O |
|  | d) | Water molecules associate due to H-bonding |
| 35. | The volume of ’10 vol.’ of at NTP is: |
|  | a) | 50 mL | b) | 25 mL | c) | 100 mL | d) | 125 mL |
| 36. | Which of the following pairs of ions make the water hard? |
|  | a) |  | b) |  | c) |  | d) |  |
| 37. | Which of the following gas is insoluble in water? |
|  | a) |  | b) |  | c) |  | d) |  |
| 38. | Which will produce hard water? |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 39. | In Bosch’s process which gas is utilised for the production of hydrogen gas? |
|  | a) | Producer gas | b) | Water gas | c) | Coal gas  | d) | None of these |
| 40. | Triple point of water is |
|  | a) | 203 K | b) | 193 K | c) | 273 K | d) | 373 K |
| 41. | The hybridization of the orbitals of oxygen in is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 42. | Which of the following pairs will not produce dihydrogen gas? |
|  | a) | Cu + HCl (dil.) | b) |  | c) | Mg + steam | d) | Na + alcohol |
| 43. | Calgon used as water softner is |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 44. | Permutit is: |
|  | a) | Hydrated sodium aluminium silicate |
|  | b) | Sodium hexa meta-phosphate  |
|  | c) | Sodium silicate  |
|  | d) | Sodium meta-aluminate |
| 45. | The rubber foam is produced by passing oxygen through rubber foaming material. This oxygen is released from: |
|  | a) | Nitric oxide  | b) | Hydrogen peroxide | c) | Water  | d) |  |
| 46. | Which is the poorest reducing agent? |
|  | a) | Atomic hydrogen | b) | Nascent hydrogen |
|  | c) | Dihydrogen | d) | All have same reducing strength |
| 47. | In context with the industrial preparation of hydrogen from water gas which of the following is the correct statement.  |
|  | a) | CO and are fractionally separated using differences in their densities |
|  | b) | CO is removed by absorption in aqueous solution  |
|  | c) |  is removed through occlusion with Pd |
|  | d) | CO is oxidised to with steam in the presence of a catalyst followed by absorption of in alkali  |
| 48. | The number of radioactive isotopes of hydrogen is: |
|  | a) | 1 | b) | 2 | c) | 3 | d) | None of these |
| 49. | The oxidation number of oxygen in hydrogen peroxide is |
|  | a) | + 1 | b) | - 1 | c) | + 2 | d) | - 2 |
| 50. | The normality of 30 volume is  |
|  | a) | 2.678 N | b) | 5.336 N | c) | 8.034 N | d) | 6.685 N |
| 51. | Acidified solution of chromic acid on treatment with yields: |
|  | a) |  | b) |  | c) |  | d) |  |
| 52. | The hair dyes available in the market generally contain two bottles, one containing the dye and the other hydrogen peroxide. Before applying the dye, the two solutions are mixed. The hydrogen peroxide. |
|  | a) | Is added to dilute the solution of the dye |
|  | b) | Oxidises the dye to give the desired colour |
|  | c) | Reduces the dye to give the desired colour |
|  | d) | Acidifies the solution of the dye |
| 53. | In periodic table tritium is placed in group: |
|  | a) | I | b) | II | c) | III | d) | IV |
| 54. | The and hydrogen differ in respect of which of the following? |
|  | a) | In the molecular weight | b) | In the nature of spin of protons  |
|  | c) | In the nature of spin of electrons  | d) | In the number of protons  |
| 55. | The bond energy of covalent O—H bond in water is: |
|  | a) | Equal to bond energy of hydrogen bond |
|  | b) | Greater than bond energy of hydrogen bond |
|  | c) | Lesser than bond energy of hydrogen bond |
|  | d) | None of the above |
| 56. | Water acts as excellent solvent due to: |
|  | a) | Hydrogen bonding |
|  | b) | Neutral nature |
|  | c) | High dielectric constant |
|  | d) | None of the above |
| 57. |  is an example of which type of the hydride? |
|  | a) | Metallic | b) | Ionic | c) | Covalent | d) | Polymeric |
| 58. | An aqueous solution of hydrogen peroxide is  |
|  | a) | Alkaline | b) | Neutral | c) | Strongly acidic  | d) | Weakly acidic |
| 59. | The O—O bond length in  |
|  | a) | 1.54 Å | b) | 1.48 Å | c) | 1.34 Å | d) | 1.01 Å |
| 60. | Moist hydrogen peroxide cannot be dried over conc. because  |
|  | a) | It can catch fire | b) | It is reduced by  |
|  | c) | It is oxidised by  | d) | It is decomposed by  |
| 61. | The strength in volumes of a solution containing 30.36g/L of is  |
|  | a) | 10 volume | b) | 20 volume  | c) | 5 volume  | d) | None of these |
| 62. | Tritium emits: |
|  | a) | -particles | b) | β-particles | c) | γ-rays  | d) | Neutrons |
| 63. | The ratio of electron, proton and neutron in tritium is: |
|  | a) | 1 : 1 : 1 | b) | 1 : 1 : 2 | c) | 2 : 1 : 1 | d) | 1 : 2 : 1 |
| 64. | Hydrogen directly combines with |
|  | a) | Cu | b) | Au | c) | Ca | d) | Ni |
| 65. | In which of the following reactions, is acting as a reducing agent?  |
|  | a) |  | b) |  |
|  | c) |  | d) |  |
| 66. | Permutit is the technical name given to  |
|  | a) | Aluminates of calcium and sodium | b) | Hydrated silicate of aluminium and sodium |
|  | c) | Silicates of calcium and magnesium | d) | Silicates of calcium and sodium |
| 67. | The best method to test whether a clear liquid is water, is to: |
|  | a) | Taste the liquid  |
|  | b) | Smell the liquid |
|  | c) | Add litmus paper |
|  | d) | Add few drops on anhydrous copper sulphate and look for colour change |
| 68. | An inorganic compound liberates when heated, turns an acid solution of KI brown and . The substance is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 69. | Heavy water is qualified as heavy because it is: |
|  | a) | A heavy liquid  |
|  | b) | An oxide of a heavier isotope of oxygen  |
|  | c) | An oxide of deuterium  |
|  | d) | Denser than water |
| 70. | Permanent hardness can be removed by adding  |
|  | a) |  | b) |  | c) |  | d) |  |
| 71. | The ionization energy of hydrogen is: |
|  | a) | Lower than alkali metals |
|  | b) | Lower than halogens |
|  | c) | Closer to alkali metals |
|  | d) | Closer to halogens |
| 72. | Which one of the following reactions represents the oxidising property of  |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 73. | Hydrogen peroxide is prepared in the laboratory by  |
|  | a) | Passing into  | b) | Adding to dil.  |
|  | c) | Adding to cold water | d) | Adding into  |
| 74. | Heavy water is  |
|  | a) | Water at  |
|  | b) | Water containing Fe, Cr, Mn |
|  | c) |  |
|  | d) | Water obtained after a number of distillations |
| 75. | hydrogen differ in |
|  | a) | Nuclear charge | b) | Nuclear reaction | c) | Electron spin | d) | Proton spin |
| 76. | Hydrogen peroxide is manufactured by the auto-oxidation of: |
|  | a) | 2-ethylanthraquinol | b) | Anthraquinone | c) | Naphthalene | d) | Anthracene |
| 77. | What is the product of the reaction of WITH  |
|  | a) |  | b) |  | c) |  | d) |  |
| 78. | One mole of calcium phosphide on reaction with excess water gives: |
|  | a) | One mole of phosphene |
|  | b) | Two moles of phosphoric acid |
|  | c) | Two moles of phosphine |
|  | d) | One mole of phosphorus pentaoxide  |
| 79. | Hydrogen may be prepared by heating a solution of caustic soda with: |
|  | a) | Mg | b) | Zn | c) | Fe | d) | Ag |
| 80. |  is manufactured these days  |
|  | a) | By the action of  | b) | By the action of  |
|  | c) | By electrolysis of 50%  | d) | By burning hydrogen in excess of oxygen  |
| 81. |  |
|  | a) |  | b) |   | c) |  | d) |   |
| 82. | The most reactive state of hydrogen is: |
|  | a) | Atomic hydrogen  | b) | Heavy hydrogen  | c) | Molecular hydrogen | d) | Nascent hydrogen |
| 83. | The number of protons, electrons and neutrons respectively in a molecule of heavy water is: |
|  | a) | 10, 10, 10 | b) | 8, 10, 11  | c) | 10, 11, 10  | d) | 11, 10, 10  |
| 84. | Ordinary hydrogen is a mixture at: |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 85. | Heavy water freezes at: |
|  | a) | -3.8 ͦ C | b) | 3.8 ͦ C | c) | 0 ͦ C | d) | 3.2 ͦ C |
| 86. | The electronic configuration of deuterium is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 87. |  |
|  | a) | Alcohol  | b) | Alkali  | c) | Nitric acid  | d) | Chloroform  |
| 88. | Hydrogen produced in contact with substance which is to be reduced is: |
|  | a) |  | b) |  | c) | Active H | d) | Nascent H |
| 89. |  |
|  | a) | Neutral medium  |
|  | b) | Acidic medium  |
|  | c) | Alkaline medium  |
|  | d) | acidic as well as in alkaline medium |
| 90. | The concentration of solution of ‘10 volume’ is  |
|  | a) | 30% | b) | 3% | c) | 1% | d) | 10% |
| 91. | Water possesses a high dielectric constant, therefore  |
|  | a) | It always contains ions | b) | It is universal solvent |
|  | c) | Can dissolve covalent compounds | d) | Can conduct electricity |
| 92. | Tailing of mercury is a laboratory test for: |
|  | a) |  | b) | Hg | c) |  | d) |  |
| 93. | Which method cannot be used to remove hardness of water? |
|  | a) | Clark’s method |
|  | b) | By adding washing soda |
|  | c) | Calgon process |
|  | d) | Filtration  |
| 94. | Which of the following could act as a propellant for rockets? |
|  | a) |  | b) |  | c) |  | d) |  |
| 95. | When electric current is passed through an ionic hydride in the molten state, |
|  | a) | Hydrogen is liberated at the cathode |
|  | b) | Hydrogen is liberated at the anode |
|  | c) | Hydride ion migrates towards cathode |
|  | d) | No reaction takes place |
| 96. | Deuterium was discovered by: |
|  | a) | Urey  | b) | Aston | c) | Rutherford | d) | Chadwick |
| 97. |  |
|  | a) | 50 | b) | 25 | c) | 6.25 | d) | 5.88 |
| 98. | Ortho and para-hydrogen differ in the: |
|  | a) | Number of protons | b) | Molecular weight | c) | Nature of spins of protons | d) | Nature of spins of electrons |
| 99. | Decomposition of is retarded by: |
|  | a) | Acetanilide  | b) | Alcohol | c) |  | d) | All of these  |
| 100. | Heavy water possesses: |
|  | a) | Insoluble impurities like silica |
|  | b) | Impurities like carbonates and bicarbonates of calcium and magnesium  |
|  | c) | High density and different physical properties than those of water |
|  | d) | The capacity to expedite the rate of nuclear reactions |
| 101. | Which element forms maximum compound in chemistry? |
|  | a) | O | b) | H | c) | Si | d) | C |
| 102. | The bleaching properties of are due to its: |
|  | a) | Reducing properties  | b) | Oxidizing properties | c) | Unstable nature | d) | Acidic nature |
| 103. | Which one of the following is called amphoteric solvent?  |
|  | a) | Ammonium hydroxide  | b) | Chloroform |
|  | c) | Benzene  | d) | Water |
| 104. | The colour of hydrogen is |
|  | a) | Yellow | b) | Orange | c) | Black | d) | Colourless |
| 105. |  |
|  | a) | 2.5 g | b) | 25.5 g | c) | 3.0 g | d) | 8.0 g |
| 106. |  |
|  | a) |  |
|  | b) |  |
|  | c) |   |
|  | d) |  |
| 107. | Decolourisation of acidified potassium permanganate occurs when is added to it. This is due to: |
|  | a) | Oxidation of  |
|  | b) | Reduction of  |
|  | c) | Both oxidation and reduction of  |
|  | d) | None of the above |
| 108. | Which hydride is neutral? |
|  | a) |  | b) |  | c) |  | d) |  |
| 109. | Hydrogen burns with: |
|  | a) | Smoky flame | b) | Yellow flame | c) | Blue flame | d) | Pale yellow flame |
| 110. | Zeolites are extensively used in:  |
|  | a) | Softening of water and catalyst | b) | Preparing heavy water  | c) | Increasing the hardness of water | d) | Mond’s process |
| 111. | Deuterium, an isotope of hydrogen is: |
|  | a) | Radioactive  | b) | Non-radioactive  | c) | Heaviest  | d) | Lightest |
| 112. | Which is the lightest gas? |
|  | a) | Nitrogen | b) | Hydrogen | c) | Helium | d) | Oxygen |
| 113. | Temporary harness is caused due to the presence of: |
|  | a) |  | b) |  | c) |  | d) |  |
| 114. |  |
|  | a) | Diamagnetic | b) | Paramagnetic  | c) | Ferromagnetic  | d) | None of these |
| 115. | Commercial 11.2 volume solution has a molarity of  |
|  | a) | 1.0 | b) | 0.5 | c) | 11.2 | d) | 1.12 |
| 116. | The life period of atomic hydrogen is: |
|  | a) | Only five minute |
|  | b) | Only one third of a second |
|  | c) | Only two hour |
|  | d) | 10 second |
| 117. | There is a sample of 20 volume of hydrogen peroxide solution. Calculate its strength |
|  | a) |  | b) |  | c) |  | d) |  |
| 118. | When the same amount of zinc is treated separately with excess of sulphuric acid and excess of sodium hydroxide, the ratio of volumes of hydrogen evolved is: |
|  | a) | 1 : 1 | b) | 1 : 2 | c) | 2 : 1 | d) | 9 : 4 |
| 119. | Atomic hydrogen is obtained by: |
|  | a) | Electrolysis of heavy water |
|  | b) | Reaction of water with heavy metals |
|  | c) | Thermal decomposition of water  |
|  | d) | Passing silent electric discharge through hydrogen at low pressure  |
| 120. | Which loses weight on exposure to the atmosphere? |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) | Anhydrous sodium carbonate |
| 121. | Which can adsorb large volumes of hydrogen gas? |
|  | a) | Colloidal solution of palladium |
|  | b) | Finely divided nickel |
|  | c) | Colloidal ferric hydroxide |
|  | d) | Finely divided platinum  |
| 122. | In the hydrogen peroxide molecule: |
|  | a) | Two hydrogen atoms are connected to one of the oxygen  |
|  | b) | All the four atoms are in the same plane  |
|  | c) | The four atoms are arranged in a non-linear and non-planar manner |
|  | d) | O—H bonds are polar but molecule is non-polar |
| 123. | Fluorine reacts with water to form: |
|  | a) | Fluorine water  | b) | Oxygen  | c) | Ozone | d) | Oxygen, ozone |
| 124. | The hardness of water sample containing 0.002 mole of magnesium sulphate dissolved in a litre of water is expressed as |
|  | a) | 20ppm | b) | 200ppm | c) | 2000ppm | d) | 120ppm |
| 125. | Adsorbed hydrogen by palladium is known as |
|  | a) | Nascent | b) | Atomic | c) | Heavy  | d) | Occluded  |
| 126. | When hydrogen peroxide is added to acidified potassium dichromate, a blue colour is produced due to formation of  |
|  | a) |  | b) |  | c) |  | d) |  |
| 127. | Which is false about  |
|  | a) | Act as both oxidising and reducing agent | b) | Two OH bonds lie in the same plane |
|  | c) | Pale blue liquid  | d) | Can be oxidised by ozone |
| 128. | The reaction of manifests |
|  | a) | Reducing action of  | b) | Oxidising nature of  |
|  | c) | Alkaline nature of  | d) | Acidic nature of  |
| 129. | The reagent commonly used to determine hardness of water titrimetrically is |
|  | a) | Oxalic acid |
|  | b) | Sodium thiosulphate |
|  | c) | Sodium citrate |
|  | d) | Disodium salt of EDTA |
| 130. | Ordinary hydrogen has preponderance of: |
|  | a) | Hydrogen atoms |
|  | b) | Deuterium atoms |
|  | c) | Tritium atoms |
|  | d) | The above three are in equal proportions |
| 131. | Benzene is oxidized by in presence of to : |
|  | a) | Phenol  | b) | Cyclohexane  | c) | Benzaldehyde  | d) | Benzoic acid |
| 132. | Which of the following is an example of interstitial hydride? |
|  | a) |  | b) |  | c) |  | d) |  |
| 133. | If water is boiled for sometime it becomes free from: |
|  | a) | Permanent hardness  |
|  | b) | Temporary hardness  |
|  | c) | Suspended matter  |
|  | d) | Temporary hardness and dissolved gases |
| 134. | Polyphosphates are used as water softening agents because they |
|  | a) | Form soluble complexes with anionic species |
|  | b) | Precipitate anionic species |
|  | c) | Precipitate cationic species |
|  | d) | Form soluble complexes with cationic species |
| 135. | When two ice cubes are pressed over each other they unite to form one cube. Which of the following forces are responsible to hold them together? |
|  | a) | Ionic interaction |
|  | b) | Van der Waals’ forces |
|  | c) | Covalent interaction |
|  | d) | Hydrogen bond formation |
| 136. | The pH of a solution of is 6.0. Some chloride gas is bubbled into this solution. Which of the following is correct? |
|  | a) | The pH of resultant solution becomes 8.0 |
|  | b) | Hydrogen gas is liberated from resultant solution  |
|  | c) | The pH of resultant solution becomes less than 6.0 and oxygen gas is liberated  |
|  | d) |  is formed in the resultant solution  |
| 137. | Permanent hardness of water can be removed by adding Calgon . This is an example of: |
|  | a) | Adsorption | b) | Exchange of ion | c) | Precipitation  | d) | None of these |
| 138. | Hydrogen molecules are: |
|  | a) | Monoatomic and form ions |
|  | b) | Diatomic and form ions |
|  | c) | Diatomic and form ions |
|  | d) | Monoatomic and form ions |
| 139. | Hydrogen reacts with …… even in the dark. |
|  | a) |  | b) |  | c) |  | d) |  |
| 140. | 1000 g aqueous solution of contains 10 g of calcium carbonate. Hardness of the solution is: |
|  | a) | 10 ppm | b) | 100 ppm | c) | 1000 ppm | d) | 10000 ppm |
| 141. | Metal which does not react with cold water but evolves with steam is: |
|  | a) | Na | b) | K | c) | Pt | d) | Fe |
| 142. | The pair that yields the same gaseous product on reaction with water: |
|  | a) |  | b) |  | c) |  | d) |  |
| 143. | The heaviest among the following is:  |
|  | a) | Deuterium  | b) | Helium  | c) | Tritium  | d) | Hydrogen  |
| 144. | The molarity of a 100 mL solution containing 5.1 g of hydrogen peroxide is: |
|  | a) | 0.15 *M* | b) | 1.5 *M* | c) | 3.0 *M* | d) | 50.0 *M* |
| 145. | The metal that does not displace hydrogen from an acid is: |
|  | a) | Hg | b) | Zn | c) | Al | d) | Ca |
| 146. | Deionised water is obtained by passing hard water through |
|  | a) | Anion exchanger | b) | Zeolite |
|  | c) | Cation exchanger | d) | Both anion and cation exchanger |
| 147. | The strength in volumes of a solution containing  |
|  | a) | 10 V | b) | 5 V | c) | 20 V | d) | None of these |
| 148. | Hydrogen was discovered by: |
|  | a) | Scheele  | b) | Berzelius | c) | Cavendish  | d) | Priestley |
| 149. | Hard water becomes free from …… ions when passed through ion exchange resin containing groups. |
|  | a) |  | b) |  | c) |  | d) |  |
| 150. | The sum of number of neutrons and protons in one of the isotopes of hydrogen is: |
|  | a) | 3 | b) | 4 | c) | 5 | d) | 6 |
| 151. | Water contracts on heating: |
|  | a) | To 100 | b) | From 0 to 4 | c) | To 273 K | d) | From 10 to 20 |
| 152. | Hydrogen combines directly with: |
|  | a) | Ca | b) | Cu | c) | Zn | d) | Fe |
| 153. |  |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 154. |  |
|  | a) | 3% | b) | 30% | c) | 10% | d) | 5% |
| 155. | Ammonium persulphate solution on heating under reduced pressure gives: |
|  | a) |  | b) |  | c) |  | d) |  |
| 156. | Which statement about zeolite is false? |
|  | a) | They are used as cation exchanger  |
|  | b) | They have open structure which enables them to take up small molecules |
|  | c) | Zeolites are alumino silicates having three dimensional network  |
|  | d) |   |
| 157. | Which of the following metal evolves hydrogen on reacting with cold dilute  |
|  | a) | Fe | b) | Cu | c) | Al | d) | Mg |
| 158. | The reaction of water with sodium and potassium is  |
|  | a) | Endothermic | b) | Reversible |
|  | c) | Exothermic | d) | Irreversible and endothermic |
| 159. | High boiling point of water is due to: |
|  | a) | Its high specific heat |
|  | b) | Hydrogen bonding  |
|  | c) | High dielectric constant |
|  | d) | Low dissociation constant |
| 160. | Ozone reacts with to give oxygen. One volume of ozone gives: |
|  | a) | One volume of oxygen  |
|  | b) | Half volume of oxygen |
|  | c) | 1.5 volume of oxygen  |
|  | d) | Two volumes of oxygen  |
| 161. | Which of the following statements do not define the characteristic property of water “water is a universal solvent”.? |
|  | a) | It has high liquid range |
|  | b) | It has very low dielectric constant |
|  | c) | It can dissolve maximum number of compounds |
|  | d) | None of the above |
| 162. | Sodium zeolite is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 163. |  |
|  | a) | Oxygen  | b) | Hydrogen  | c) | Nitric oxide  | d) | Nascent hydrogen  |
| 164. | The oxidizing property of is best explained by assuming that two oxygen atoms in its molecule are: |
|  | a) | Bonded differently  |
|  | b) | Bonded similarly |
|  | c) | Bonded covalently  |
|  | d) | Bonded by hydrogen bonds |
| 165. |  |
|  | a) | Iron container after addition of stabilizer  |
|  | b) | Glass container after addition of stabilizer |
|  | c) | Plastic container after addition of stabilizer  |
|  | d) | None of the above  |
| 166. | Hydrogen is not used for: |
|  | a) | Manufacture of vegetable ghee |
|  | b) | Production of high temperature |
|  | c) | As rocket fuel with kerosene  |
|  | d) | As a reducing agent  |
| 167. |  |
|  | a) | Steam distillation  |
|  | b) | Fractional distillation  |
|  | c) | Freezing in freezing mixture |
|  | d) | Distillation under reduced pressure |
| 168. |  |
|  | a) | Al over KOH |
|  | b) |  |
|  | c) | Electrolysis of warm solution of Ba(OH)2 using Ni electrodes  |
|  | d) | All of the above |
| 169. | Heavy water is manufactured in India at: |
|  | a) | Delhi  | b) | Trombay | c) | Bhilai | d) | None of these |
| 170. | What is formed when calcium carbide reacts with heavy water? |
|  | a) |  | b) |  | c) |  | d) |  |
| 171. | The ionization of hydrogen atom gives: |
|  | a) | Hydride ion | b) | Hydronium ion  | c) | Proton  | d) | Hydroxyl ion |
| 172. | ? |
|  | a) | It is more stable in basic solution  |
|  | b) | It acts as strong oxidizing agent in acid and basic solutions  |
|  | c) | It is decomposed by  |
|  | d) | It behaves as reducing agent towards |
| 173. | Which one of the following is a true peroxide? |
|  | a) |  | b) |  | c) |  | d) |  |
| 174. | What is the volume of “20 volume” required to get of oxygen at STP? |
|  | a) |  | b) |  | c) |  | d) |  |
| 175. | The melting points of most of the solid substances increase with an increase of pressure. However, ice melts at a temperature lower than its usual melting point when the pressure is increased. This is because: |
|  | a) | Ice is less denser than water  |
|  | b) | Pressure generates heat |
|  | c) | The chemical bonds break under pressure |
|  | d) | Ice is not a true solid  |
| 176. | Heavy water was discovered by: |
|  | a) | Nernst  | b) | Haber  | c) | Urey and Washburn | d) | Aston |
| 177. | The maximum possible number of hydrogen bonds a water molecule can form is: |
|  | a) | 1 | b) | 2 | c) | 3 | d) | 4 |
| 178. |  |
|  | a) | Reducing property | b) | Oxidizing property | c) | Bleaching property  | d) | Acidic property |
| 179. | Hydrogen gas will not reduce: |
|  | a) | Heated cupric oxide  |
|  | b) | Heated ferric oxide |
|  | c) | Heated stannic oxide |
|  | d) | Heated aluminium oxide |
| 180. | Which pair does not show hydrogen isotopes?  |
|  | a) | and hydrogen  | b) | Protium and deuterium  |
|  | c) | Deuterium and tritium | d) | Tritium and protium  |
| 181. | The hardness of water is due to …. Metal ions. |
|  | a) |  | b) |  | c) |  | d) |  |
| 182. | Under what conditions of temperature and pressure, the formation of atomic hydrogen from molecular hydrogen will be favoured more? |
|  | a) | High temperature and low pressure |
|  | b) | Low temperature and low pressure |
|  | c) | High temperature and high pressure |
|  | d) | Low temperature and high pressure |
| 183. | Heavy hydrogen is used: |
|  | a) | In filling the balloons  |
|  | b) | In studying reaction mechanism  |
|  | c) | In calculating heat of formation  |
|  | d) | Iron hydroxide precipitates |
| 184. |  |
|  | a) | Acidic nature of |
|  | b) | Alkaline nature of  |
|  | c) | Oxidizing nature of  |
|  | d) | Reducing nature of  |
| 185. |  |
|  | a) | Decrease in free energy |
|  | b) | Increase in free energy  |
|  | c) | No change in free energy  |
|  | d) | Evolution of heat  |
| 186. | Which of the following statements is correct? Dielectric constant of  |
|  | a) | Increases with dilution | b) | Decreases with dilution |
|  | c) | Is unaffected on dilution | d) | None of the above |
| 187. | Heavy water is not used for dinking because: |
|  | a) | It is poisonous |
|  | b) | It is costly |
|  | c) | Its physiological action is different from ordinary water |
|  | d) | Its chemical properties are different from ordinary water  |
| 188. | Maximum density of heavy water is at: |
|  | a) | 0 ͦ C | b) | 4 ͦ C | c) | 11.6 ͦ C | d) | 3.8 ͦ C |
| 189. | The catalyst used in Bosch process of manufacture of is: |
|  | a) | Finely divided Ni | b) |  | c) |  | d) |  |
| 190. | In which of the following reactions, behaves as a reducing agent? |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 191. | Among which are covalent hydride? |
|  | a) |  | b) |  | c) |  | d) |  |
| 192. | In which reaction hydrogen is not formed? |
|  | a) | Copper and hydrochloric acid |
|  | b) | Iron and sulphuric acid  |
|  | c) | Magnesium and steam  |
|  | d) | Sodium and alcohol |
| 193. | The adsorption of hydrogen by metals is called |
|  | a) | Adsorption | b) | Occlusion | c) | Hydrogenation | d) | Dehydrogenation |
| 194. | A molten ionic hydride on electrolysis gives: |
|  | a) |  |
|  | b) |  |
|  | c) |   |
|  | d) |  |
| 195. | Moist hydrogen cannot be dried over concentrated because:  |
|  | a) | It can catch fire |
|  | b) | It is reduced by  |
|  | c) | It is oxidized by  |
|  | d) | It decomposes  |
| 196. | Both temporary and permanent hardness are removed on boiling water with: |
|  | a) |  | b) |  | c) |  | d) | CaO |
| 197. | The weight percentage of deuterium in heavy water is: |
|  | a) | 22 | b) | 11.11 | c) | 4 | d) | 20 |
| 198. | 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 of methane with steam |
| 199. | Density of water is maximum at: |
|  | a) | 0 ͦC | b) | 100 ͦ C | c) | 4 ͦC | d) | 0 K |
| 200. | The most reactive isotope of H is: |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) | All the same reactivity  |
| 201. | Heavy water is used in atomic reactor as |
|  | a) | Moderator | b) | Coolant |
|  | c) | Both moderator and coolant | d) | Neither coolant nor moderator |
| 202. | The exhausted Permutit is generally regenerated by percolating through it a solution of: |
|  | a) | Sodium chloride | b) | Calcium chloride | c) | Magnesium chloride  | d) | Potassium chloride |
| 203. | The best explanations for not placing hydrogen with the group of alkali metals or halogens is: |
|  | a) | Hydrogen can form compounds with all other elements  |
|  | b) | Hydrogen is much lighter element than the alkali metals or the halogens |
|  | c) | The ionization energy of hydrogen is too high for group of alkali metals but too low for halogen group  |
|  | d) | None of the above |
| 204. | Hydrogen molecule differs from chlorine molecule in the following respect.  |
|  | a) | Hydrogen molecule is non-polar but chlorine molecule is polar |
|  | b) | Hydrogen molecule is polar while chlorine molecule is non-polar |
|  | c) | Hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not |
|  | d) | Hydrogen molecule cannot participate in coordinate bond formation but chlorine molecule can  |
| 205. | The geometry of water molecule is same as that of: |
|  | a) |  | b) |  | c) | Chlorine oxide | d) | Boron trifluoride |
| 206. | Hydrogen peroxide does not: |
|  | a) | Liberate iodine from KI |
|  | b) | Turn the titanium salt yellow |
|  | c) | Give silver peroxide with moist silver oxide |
|  | d) |  |
| 207. | The most dangerous method of preparing hydrogen would be by the action of dil. HCl and: |
|  | a) | Zn | b) | Fe | c) | K | d) | Al |
| 208. | When zeolite which is hydrated sodium aluminium silicate is treated with hard water, the sodium ions are exchanged with |
|  | a) |  | b) |  | c) |  | d) |  |
| 209. | 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 |
| 210. | During hydrogenation of oil the catalyst commonly used is: |
|  | a) |  | b) | Ni | c) | Fe | d) |  |
| 211. | Oxygen and hydrogen react to form water. This discovery was made by: |
|  | a) | Priestley  | b) | Cavendish | c) | Scheele | d) | Newton  |
| 212. | Which one of the following processes will produce hard water? |
|  | a) | Saturation of water with  | b) | Saturation of water with  |
|  | c) | Saturation of water with  | d) | Addition of to water  |
| 213. |  |
|  | a) | Electrovalent bond  | b) | Co-ordinate bond | c) | Covalent bond | d) | None of these |
| 214. | ? |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 215. |  is manufactured these days |
|  | a) | By burning hydrogen in excess of oxygen |
|  | b) | By the action of  |
|  | c) | By the action of  |
|  | d) | By electrolysis of  |
| 216. |  (the action being catalytic) only if the solution is: |
|  | a) | Basic  | b) | Acidic  | c) | Neutral  | d) | None of these |
| 217. | Ionic hydrides react with water to give |
|  | a) | Hydride ions | b) | Acidic solutions  | c) | Protons | d) | Basic solutions  |
| 218. | Hydrogen is evolved by the action of cold dilute on: |
|  | a) | Fe | b) | Mg or Mn | c) | Cu | d) | Al |
| 219. | Hydrogen peroxide for the first time was prepared by: |
|  | a) | Priestley  | b) |  | c) | Gay-Lussac | d) | Bernard  |
| 220. | Which pair does not show hydrogen isotopes? |
|  | a) |  | b) | Protium and deuterium |
|  | c) | Deuterium and tritium | d) | Tritium and protium |
| 221. | The strength of 10 volume of solution is |
|  | a) | 10 | b) | 68 | c) | 60.70 | d) | 30.36 |
| 222. | The conversion of atomic hydrogen into ordinary hydrogen is: |
|  | a) | Exothermic change |
|  | b) | Endothermic change |
|  | c) | Nuclear change |
|  | d) | Photochemical change |
| 223. | Para hydrogen is: |
|  | a) | Less stable than ortho hydrogen  |
|  | b) | More stable than ortho hydrogen |
|  | c) | As stable as ortho hydrogen |
|  | d) | None of the above |
| 224. | Some statements about heavy water are given below:(i) Heavy water is used as a moderator in nuclear reactors(ii) Heavy water is more associated than ordinary water(iii) Heavy water is more effective solvent than ordinary waterWhich of the above statements are correct? |
|  | a) | (i) and (ii) | b) | (i), (ii) and (iii) | c) | (ii) and (iii) | d) | (i) and (iii) |
| 225. |  |
|  | a) | Reaction with a ferrous salt  |
|  | b) | Reaction with iodides  |
|  | c) | Reaction with lead sulphide |
|  | d) | Reaction with in acidic medium  |
| 226. | When hydrolith is treated with water it yields: |
|  | a) |  | b) |  | c) |  | d) |  |
| 227. | Atomic hydrogen produces formaldehyde when it reacts with: |
|  | a) |  | b) | CO | c) |  | d) |  |
| 228. |  |
|  | a) |  | b) |  | c) |  | d) |  |
| 229. | Which one of the following reaction does not form gaseous product? |
|  | a) |  | b) | Acidified  |
|  | c) |  | d) |  |
| 230. | The structure of is: |
|  | a) |  | b) |  | c) | H—O—O—H | d) |  |
| 231. | Which cannot be oxidised by  |
|  | a) |  | b) |  | c) | KI | d) |  |
| 232. |  |
|  | a) | Antiseptic  | b) | Rocket fuel | c) | Germicide | d) | Insecticide |
| 233. | Hydrogen peroxide is now generally prepared on industrial scale by the: |
|  | a) |  |
|  | b) |   |
|  | c) | Electrolysis of 50%  |
|  | d) | Burning hydrogen in excess of oxygen  |
| 234. | The equilibrium molecular structure of hydrogen peroxide is  |
|  | a) | Planar as given below  | b) | Linear |
|  | c) | Tetrahedral  | d) | Non-planar  |
| 235. |  |
|  | a) | 9.1*M* | b) | 2.68 *M* | c) | 2.5 *M* | d) | 26.8 *M* |
| 236. |  |
|  | a) |  | b) |  | c) |  | d) |  |
| 237. | Tritium is obtained by: |
|  | a) | Nuclear reactions |
|  | b) | Passing steam over heated C |
|  | c) |  |
|  | d) |  |
| 238. |  |
|  | a) | 100 ͦ | b) | 90 ͦ | c) | 109 ͦ 28′ | d) | 180 ͦ |
| 239. | In laboratory, is prepared by |
|  | a) | Cold  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 240. | The formula of heavy water is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 241. | Hydrogen resembles in many of its properties with: |
|  | a) | Alkali metals | b) | Halogens | c) | Both (a) and (b) | d) | None of these |
| 242. | Hydrogen is not obtained when zinc reacts with  |
|  | a) | Cold water | b) | hot NaOH solution  | c) | dil.  | d) | dil. HCl |
| 243. | The H-O-H angle in water molecule is about |
|  | a) |  | b) |  | c) |  | d) |  |
| 244. | Hydrogen adsorbed on palladium is known as: |
|  | a) | Atomic H | b) | Nascent H | c) | Occluded H | d) | Heavy H |
| 245. | Hydrogen molecule differs from chlorine molecule in the following respect |
|  | a) | Hydrogen molecule is non-polar but chlorine molecule is polar |
|  | b) | Hydrogen molecule is polar while chlorine molecule is non-polar |
|  | c) | Hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not |
|  | d) | Hydrogen molecule cannot participate in coordination bond formation but chlorine molecule can |
| 246. |  |
|  | a) | Traces of acids | b) | Finely divided metals | c) | Acetanilide  | d) | Alcohol  |
| 247. | Which one of the following is used for reviving the exhausted ‘permutit’?  |
|  | a) | HCl solution  | b) | 10% solution | c) | 10% solution | d) | 10% NaCl solution  |
| 248. | The volume strength of solution is |
|  | a) |  | b) |  | c) |  | d) |  |
| 249. | Nascent hydrogen consists of: |
|  | a) | Hydrogen atoms with excess energy  |
|  | b) | Hydrogen molecules with excess energy  |
|  | c) | Hydrogen ions in excited state |
|  | d) | Solvated protons  |
| 250. | At absolute zero: |
|  | a) | Only para hydrogen exists  |
|  | b) | Only ortho hydrogen exists |
|  | c) | Both para and ortho hydrogen exist  |
|  | d) | None of the above |
| 251. | Hydrogen peroxide works as: |
|  | a) | An oxidant only |
|  | b) | A reductant only |
|  | c) | An acid only |
|  | d) | An oxidant, a reductant and an acid |
| 252. | Which of the following will not give on hydrolysis? |
|  | a) |  | b) |  | c) |  | d) |  |
| 253. |  |
|  | a) | 1 | b) | 2 | c) | 3 | d) | Zero |
| 254. |  |
|  | a) | 5.88 | b) | 6.25 | c) | 25 | d) | 50 |
| 255. | Exhausted permutit does not contain …….ion.  |
|  | a) |  | b) |  | c) |  | d) |  |
| 256. | The molarity of pure water at 4 ͦ C is: |
|  | a) | 1 *M* | b) | 2.5 *M* | c) | 5 *M*  | d) | 55.5 *M* |
| 257. | The gas used in the hydrogenation of oils in presence of nickel as a catalyst is: |
|  | a) | Methane  | b) | Ethane | c) | ozone | d) | Hydrogen |
| 258. | The volume of oxygen liberated from 0.68 g of is  |
|  | a) | 112mL | b) | 224mL | c) | 56mL | d) | 336mL |
| 259. | Which hydride is an ionic hydride? |
|  | a) |  | b) |  | c) |  | d) |  |
| 260. |  |
|  | a) | Neutral solution  | b) | Acidic solution  | c) | Alkaline solution | d) | Non-polar medium |
| 261. | Point out the incorrect statement. |
|  | a) | Hardness of water depends upon its soap consuming power  |
|  | b) | Temporary hardness is due to bicarbonates of calcium and magnesium |
|  | c) | Permanent hardness is due to soluble sulphates, chlorides and nitrates of Ca and Mg |
|  | d) | Permanent hardness can be removed by boiling water |
| 262. |  The change observed in the oxidation state of iron is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 263. | Which of the following is correct about heavy water? |
|  | a) | Water at having maximum density is known as heavy water |
|  | b) | It is formed by the combination of heavier isotope of hydrogen and oxygen |
|  | c) | It is heavier than water |
|  | d) | None of the above |
| 264. | Hydrogen is prepared on large scale for industrial use |
|  | a) |  | b) |  | c) |  | d) | From water gas |
| 265. | Hydrogen is obtained by the action of an alloy of silicon and iron with The process is called: |
|  | a) | Wood process | b) | Bosch process | c) | Haber process | d) | Silicol process |
| 266. | In transforming 0.01 mole of PbS to the volume of 10 volume required will be |
|  | a) | 11.2mL | b) | 22.4mL | c) | 33.6mL | d) | 44.8mL |
| 267. | Hydrogen peroxide when added to a solution of potassium permanganate acidified with sulphuric acid  |
|  | a) | Forms water only |
|  | b) | Acts as an oxidising agent |
|  | c) | Acts as a reducing agent |
|  | d) | Reduces sulphuric acid |
| 268. | Water is oxidised to oxygen by |
|  | a) |  | b) |  | c) |  | d) | Fluorine  |
| 269. | The most abundant element in the universe is thought to be |
|  | a) | Carbon  | b) | Oxygen  | c) | Hydrogen  | d) | Nitrogen  |
| 270. | In the preparation of hydrogenated oil the chemical reaction involving hydrogen is called: |
|  | a) | Hydrogenation  | b) | Reduction  | c) | Dehydrogenation | d) | Oxidation  |
| 271. | The most abundant isotope of hydrogen is: |
|  | a) | Tritium  | b) | Deuterium | c) | Protium  | d) | Para-hydrogen  |
| 272. | Which statement is not correct for hydrogen peroxide?  |
|  | a) |  |
|  | b) | It sometimes acts as a reducing agent  |
|  | c) | It acts as an oxidizing agent |
|  | d) |   |
| 273. | Which one is correct for perhydrol? |
|  | a) |  |
|  | b) | Its molarity is 8.8 *M* |
|  | c) | It is used as antiseptic and germicide |
|  | d) | All of the above |
| 274. | Hydrogen has a tendency to gain one electron in order to acquire helium configuration. It thus, resembles: |
|  | a) | Alkali metals | b) | Noble gases | c) | Halogens | d) | Alkaline earth metals |
| 275. | Calgon is an industrial name given to: |
|  | a) | Normal sodium phosphate |
|  | b) | Sodium meta-aluminate |
|  | c) | Sodium hexa meta-phosphate |
|  | d) | Hydrated sodium aluminium silicate  |
| 276. | For the bleaching of hair, the substance used is:  |
|  | a) |  | b) | Bleaching powder | c) |  | d) |  |
| 277. | In solid hydrogen, the intermolecular bonding is: |
|  | a) | Ionic  | b) | Van der Waals’ | c) | Metallic  | d) | Covalent |
| 278. | The species that does not contains peroxide ions is: |
|  | a) |  | b) |  | c) |  | d) |  |
| 279. | The critical temperature of water is higher than that of molecule has: |
|  | a) | Fewer electrons than oxygen  |
|  | b) | Two covalent bonds |
|  | c) | V-shape |
|  | d) | Dipole moment |
| 280. |  |
|  | a) | Colourless liquid  |
|  | b) | A gas |
|  | c) | Blue syrupy liquid  |
|  | d) | Pale blue syrupy liquid  |
| 281. | When silicon is boiled with caustic soda solution, the gas evolved is: |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 282. | In which of the following reactions hydrogen peroxide is a reducing agent? |
|  | a) |  |
|  | b) |  |
|  | c) |  |
|  | d) |  |
| 283. | Which does not react with cold water? |
|  | a) |  | b) |  | c) |  | d) |  |
| 284. | Deuterium resembles hydrogen in chemical properties but reacts: |
|  | a) | Slower the hydrogen  |
|  | b) | Faster than hydrogen  |
|  | c) | More vigorously than hydrogen  |
|  | d) | Just as hydrogen  |

**ACTIVE SITE TUTORIALS**

**Date :** 23-07-2019 **TEST ID: 142**

**Time :** 04:44:00 **CHEMISTRY**

**Marks :** 1136

 9.HYDROGEN

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| **: ANSWER KEY :** |

|  |
| --- |
| **1) a 2) d 3) b 4) a****5) a 6) a 7) b 8) b****9) c 10) c 11) b 12) b****13) c 14) d 15) c 16) c****17) b 18) c 19) a 20) b****21) c 22) c 23) c 24) a****25) b 26) d 27) a 28) d****29) b 30) d 31) b 32) b****33) c 34) d 35) a 36) b****37) c 38) a 39) b 40) c****41) d 42) a 43) a 44) a****45) b 46) c 47) d 48) a****49) b 50) b 51) c 52) b****53) a 54) b 55) b 56) c****57) a 58) d 59) b 60) d****61) a 62) b 63) b 64) c****65) d 66) b 67) d 68) a****69) c 70) b 71) d 72) d****73) a 74) c 75) d 76) c****77) b 78) c 79) b 80) c****81) c 82) a 83) a 84) a****85) b 86) d 87) c 88) d****89) d 90) b 91) b 92) a****93) d 94) a 95) b 96) a****97) d 98) c 99) d 100) c****101) b 102) b 103) d 104) d****105) b 106) b 107) b 108) b****109) c 110) a 111) b 112) b****113) d 114) a 115) a 116) b****117) a 118) a 119) d 120) c****121) a 122) c 123) d 124) b****125) d 126) c 127) b 128) b****129) d 130) a 131) a 132) c****133) b 134) d 135) d 136) c****137) b 138) c 139) b 140) d****141) d 142) b 143) b 144) b****145) a 146) d 147) a 148) c****149) d 150) a 151) b 152) a****153) b 154) a 155) a 156) d****157) d 158) c 159) b 160) d****161) b 162) c 163) d 164) a****165) c 166) c 167) d 168) d****169) b 170) a 171) c 172) a****173) d 174) a 175) a 176) c****177) d 178) b 179) d 180) a****181) c 182) a 183) b 184) c****185) a 186) a 187) c 188) c****189) d 190) b 191) a 192) a****193) b 194) c 195) c 196) b****197) d 198) b 199) c 200) a****201) c 202) a 203) c 204) d****205) c 206) c 207) c 208) d****209) c 210) b 211) b 212) c****213) c 214) a 215) d 216) b****217) d 218) b 219) b 220) a****221) d 222) a 223) a 224) a****225) d 226) a 227) b 228) a****229) c 230) b 231) d 232) b****233) c 234) d 235) b 236) d****237) a 238) b 239) a 240) b****241) c 242) a 243) a 244) c****245) d 246) b 247) d 248) b****249) a 250) a 251) d 252) a****253) d 254) a 255) a 256) d****257) d 258) b 259) d 260) c****261) d 262) a 263) b 264) d****265) d 266) d 267) c 268) d****269) c 270) a 271) c 272) d****273) d 274) c 275) c 276) c****277) b 278) a 279) d 280) d****281) c 282) d 283) d 284) a** |

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 9.HYDROGEN

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| **: HINTS AND SOLUTIONS :** |

|  |  |
| --- | --- |
| 1 | **(a)**It is a fact. |
| 2 | **(d)** (Lane’s process) |
| 3 | **(b)** |
| 4 | **(a)**The radioactive isotope of hydrogen is tritium. Its half-life is 12.16 yr. It shows disintegration.  |
| 5 | **(a)** (hydrogen peroxide) is a corrosive volatile liquid. It is slightly acidic in nature. Its value is approximately  |
| 6 | **(a)**Ethylene diaminetetraacetic acid (EDTA) when treated with water, forms stable complex with metal ions and hence, remove hardness of water.  |
| 8 | **(b)** |
| 9 | **(c)**Transitions metals form metallic hydrides. |
| 10 | **(c)** |
| 11 | **(b)**Ortho and para-hydrogen possess same electronic arrangement but different spin of nuclei. |
| 12 | **(b)**Volume strength  |
| 13 | **(c)**. |
| 14 | **(d)** |
| 15 | **(c)**can be prepared by electrolysis of 50% In this method, hydrogen is liberated at cathode.**At anode :** **At cathode :**  |
| 16 | **(c)**A 30% solution of hydrogen peroxide can be obtained by the electrolysis of 50% sulphuric acid followed by vacuum distillation. The first product of electrolysis is perdisulphuric acid which reacts with water during distillation to form  (At anode)  So, ‘*X’* and ‘*Y’* contains zero and one peroxy bond respectively.  |
| 17 | **(b)** |
| 18 | **(c)** |
| 19 | **(a)** is formed by reaction of on dil  |
| 20 | **(b)** (As oxidant) (As reductant) |
| 21 | **(c)** and one electron, so sum of these is  |
| 22 | **(c)** Acidified is oxidised to blue peroxide of chromium which is soluble in ether and produces blue coloured solution.  |
| 23 | **(c)** |
| 24 | **(a)**Helium is a noble gas and does not combine with hydrogen |
| 25 | **(b)** |
| 26 | **(d)** has higher viscosity which is responsible for low solubility of dielectric constant. |
| 27 | **(a)** |
| 28 | **(d)**  |
| 29 | **(b)**Heavy water is the oxide of heavy hydrogen (deuterium), hence named heavy water. It is represented by It is used in nuclear reactor as moderator.  |
| 30 | **(d)**  |
| 31 | **(b)**It is a fact. |
| 32 | **(b)**Quantity of and volume of We know that 20 volume of means 1 L of this solution will give 20 L of oxygen at NTP.Since, oxygen liberated from 1000mL (1L) of therefore, oxygen liberated from 15mL of  |
| 33 | **(c)**Pure hydrogen peroxide is an unstable liquid and decomposes into water and oxygen either upon standing or heating.To prevent decomposition of phosphoric acid, acetanilide or glycerol are added. These acts as negative catalyst.  |
| 35 | **(a)**10 vol. means that 1 mL gives 10 mL ; thus, 50 mL will give 500 mL  |
| 38 | **(a)**  |
| 39 | **(b)** |
| 40 | **(c)**The triple point of any substance is that temperature and pressure at which the material can exist in all three phases (solid, liquid and gas) in equilibrium, specifically the triple point of water is 273. 16 K at 611.2 Pa |
| 41 | **(d)**It is a fact. |
| 42 | **(a)** |
| 43 | **(a)**Calgon is represented by sodium hexa metaphosphate,  |
| 44 | **(a)**Permutit are complex inorganic salts like sodium alumino silicate or zeolite where Z is  |
| 45 | **(b)**It is a fact. |
| 46 | **(c)**Because dihydrogen is less reactive |
| 47 | **(d)**CO is oxidised to with steam in the presence of a catalyst followed by absorption of in alkali.  |
| 48 | **(a)**Only tritium is radioactive. |
| 49 | **(b)**Oxidisation number of oxygen in hydrogen peroxide is -1. peroxide linkage  |
| 50 | **(b)**Volume strength  |
| 51 | **(c)**Chromic acid  |
| 52 | **(b)** |
| 54 | **(b)**The *Ortho* and *Para* hydrogen differ in the nature of spin of protons. In *Ortho* hydrogen, the spin of proton are in the same direction, while in *para* hydrogen the spin of proton are in opposite direction.  |
| 55 | **(b)**Covalent bonding is stronger than H-bonding. |
| 58 | **(d)** |
| 59 | **(b)**It is a fact. |
| 60 | **(d)**Moist cannot be dried over conc. because it is decomposed by  |
| 61 | **(a)**Strength of in g/L Given strength of Or  |
| 62 | **(b)** |
| 63 | **(b)**1 : 1 : 2 : : *e* : *p* : *n*  |
| 64 | **(c)** does not react with with Ca, it gives  |
| 65 | **(d)** is acting as reducing agent in the reaction that involve increase in the oxidation state of oxygen (*i.e.,* in which is being oxidised). |
| 66 | **(b)**It is  |
| 67 | **(d)**  |
| 68 | **(a)** |
| 69 | **(c)** |
| 70 | **(b)**Permanent hardness is removed by precipitating carbonates of  |
| 71 | **(d)**IE of H = -13.6 eV ; IE of halogens = 13.0 for Cl; 17.4 for F. |
| 72 | **(d)**The reaction in which is reduced while the other reactant is oxidised, represents the oxidising property of  |
| 73 | **(a)**Hydrogen peroxide is prepared by the action of on barium peroxide peroxide barium barium hydrogen peroxide carbonate peroxide  |

|  |  |
| --- | --- |
| 76 | **(c)**Industrial preparation of :(A) **By the electrolysis of 50 %**  50 % solution is electrolyzed at 0 between Pt electodes. The perdisulphuric acid is formed. **At Anode ;** **At Cathode ;** The obtained perdisulphuric acid gives on hydrolysis. This is separated by distillation at reduced pressure and thus, 30 % solution of is obtained. (B) **By the auto-oxidation of 2-ethyl-anthraquinol (Modern method) :** Anthraquinol, in a mixture of benzene and *n*-heptanol on treatment with air gives and 2-ethyl-anthraquinone. This 2-ethyl-anthraquinone on hydrogenation gives 2-ethyl-anthraquinol in presence of Pd catalyst.It is a cyclic process and in it only is consumed, 2-ethyl-anthraquinone is reobtained during reaction.  |

|  |  |
| --- | --- |
| 78 | **(c)** |
| 79 | **(b)** |
| 80 | **(c)**Electrolysis of 50% sulphuric acid is the commercial method for the preparation of hydrogen peroxide. **At anode****At cathode** |
| 81 | **(c)** |
| 82 | **(a)**It is a fact. |
| 83 | **(a)**D has 1*n*, 1p and 1*e*O has 8*n*, 8*p* and 8*e* |
| 84 | **(a)**It is a fact. |
| 85 | **(b)**It is a fact. |
| 86 | **(d)**Electronic configuration of is same. |
| 87 | **(c)**It is a fact. |
| 89 | **(d)**In acid : In alkali :  |
| 90 | **(b)**means 1mL of its solution on decomposition at NTP, give 10 mL oxygen gas. Volume of oxygen formed from 100 mL of solution at NTP = 1000 ML. 2 moles 1 mole  formed at NTP by decomposition of 68 g So, concentration of “10 volume ” approximately  |
| 92 | **(a)** with Hg to form which sticks on the walls of glass. This is called tailing of mercury, The tailing is removed by the action of  |
| 93 | **(d)**The ions responsible for hard water are soluble in water. |
| 94 | **(a)**Liq. because of low atomic mass and high enthalpy of combustion and liq. a supporter for combustion.  |
| 95 | **(b)** |
| 96 | **(a)**It is a fact. |
| 97 | **(d)** |
| 99 | **(d)** |
| 100 | **(c)** |
| 101 | **(b)**Hydrogen forms maximum number of compounds in chemistry (not carbon). |
| 102 | **(b)** |
| 103 | **(d)**Amphoteric solvent dissolves both acids and bases. is amphoteric solvent because it dissolves both acids and bases. |
| 105 | **(b)** |
| 106 | **(b)** |
| 107 | **(b)**. |
| 108 | **(b)**Its pH is 7. |
| 109 | **(c)**A characteristic of hydrogen. |
| 111 | **(b)**Deuterium () has stable nuclei, because the ratio of = 1. |
| 113 | **(d)**Bicarbonates of Ca and Mg are responsible for temporary hardness. |
| 114 | **(a)**It does not have impaired electrons. |
| 115 | **(a)**1mL solution gives 11.2 mL at NTP decomposes as |
| 116 | **(b)**It is a fact. |
| 117 | **(a)** |
| 118 | **(a)** |
| 119 | **(d)**Atomic hydrogen is obtained by passing ordinary hydrogen through an electric arc. |
| 120 | **(c)** |
| 121 | **(a)**Colloidal Pd has larger surface area. |
| 122 | **(c)**It is a fact. |
| 123 | **(d)** |
| 124 | **(b)**The hardness of water sample containing 0.02 mole of dissolved in 1 L of water.Number of moles = mass/molecular mass 0.002 = mass/120 mass = 0.24 g 0.24 g mass of in 1 L of water.Hence, hardness of  |
| 126 | **(c)** oxidises the acidified potassium dichromate solution into blue peroxide of chromium,  |
| 127 | **(b)** is pale blue liquid, it can be oxidised by ozone. acts as both oxidising and reducing agent. The value of dipole moment of is 2.1 D which suggests it cannot be planar. In fact it has open book like structure. The two O- H bonds lie in different planes |
| 129 | **(d)**It forms calcium and magnesium complex with EDTA salt |
| 130 | **(a)**Ordinary hydrogen mainly contains Protium  |
| 132 | **(c)** is an example of interstitial hydride while are the examples of covalent hydride.  |
| 133 | **(b)**It is a fact. |
| 134 | **(d)**Polyphosphates like sodium hexametaphosphates, sodium tripolyphosphate or STPP) form soluble complexes with present in hard water |
| 136 | **(c)**HCl is formed by the reduction of chlorine by hence pH further decreases.  |
| 137 | **(b)**It is a fact. |
| 138 | **(c)** |
| 139 | **(b)** |
| 140 | **(d)**Hardness is expressed in g of  |
| 141 | **(d)** |
| 142 | **(b)** |
| 143 | **(b)**Atomic mass of helium () is maximum. |
| 144 | **(b)***M* = = 1.5 |
| 145 | **(a)**Hg is placed below H in electrochemical series. |
| 146 | **(d)**Deionised or demineralised water is obtained by passing hard water through both cation and anion exchangers one after the other |
| 147 | **(a)** |
| 148 | **(c)**It is a fact. |
| 149 | **(d)**Water becomes hard when it contains dissolved salts of calcium, Mg of Fe such as chloride, sulphates, bicarbonates and carbonates.  |
| 150 | **(a)**In tritium, it is three. |
| 151 | **(b)**It is a fact. |
| 152 | **(a)**Hydrogen reacts with active metals (like alkali and alkaline earth metals) form corresponding hydrides.  |
| 153 | **(b)** |
| 154 | **(a)**Per cent conc. of =  |
| 156 | **(d)**First three choices are characteristics of zeolites. |
| 159 | **(b)**Extra energy is required to break these hydrogen bonds. |
| 160 | **(d)** |
| 161 | **(b)**Water has high dielectric constant, 82, high liquid range and can dissolve maximum number of compounds. That’s why it is used as universal solvent |
| 162 | **(c)**Sodium zeolite is used for softening of water having the formula  |
| 163 | **(d)**Nascent hydrogen, (i.e., hydrogen at the moment of generation) is more powerful reducing agent than ordinary  |
| 164 | **(a)**It is a fact. |
| 165 | **(c)** water and oxygen and the decomposition speeds up in the presence of metallic impurities, or strong bases and on exposure to light. Hence, it is stored in plastic container after addition of stabilizer.  |
| 166 | **(c)**It is a fact. |
| 167 | **(d)**It is a method to concentrate |
| 168 | **(d)** (Uyeno’s methods) and electrolysis of These all are methods to prepared pure  |
| 169 | **(b)**It is a fact. |
| 170 | **(a)** |
| 171 | **(c)** |
| 172 | **(a)** is di-basic acid and thus, less stable in basic medium.  |
| 174 | **(a)**‘20 volume ’ means that 1mL of this gives 20mL oxygen on decomposition at STP. Hence, will be obtained by  |
| 175 | **(a)**Ice Water; Also volume of ice >volume of water. Thus, an increase in pressure favours the forward reaction.  |
| 176 | **(c)** |
| 177 | **(d)**It is a fact. |
| 178 | **(b)**  |
| 179 | **(d)** |
| 180 | **(a)***Ortho* and *para* hydrogens are two forms of hydrogen which differ only in direction of spin of proton.Protium deuterium and tritium are three isotopes of hydrogen. All of them have one proton and electron each. Protium has no neutron, deuterium has one neutron and tritium has two neutrons.  |
| 181 | **(c)** |
| 182 | **(a)**The reaction is favoured by low pressure and high temperature |
| 184 | **(c)** |
| 186 | **(a)**Dielectric constant of increases with dilution. It is 93.7 for pure 97 for 90% and 120 for 65%  |
| 187 | **(c)**It is a fact. |
| 188 | **(c)** |
| 189 | **(d)**It is a fact. |
| 191 | **(a)**Hydrides are binary compounds of hydrogen. These can be classified in four groups *viz :*(i) Ionic hydrides *e.g.,* (ii) Covalent hydrides *e.g.,* (iii) Polynuclear hydrides *e.g.,* (iv) Interstitial hydrides, in which hydrogen is trapped in the interstial spaces of transition metals.  |
| 194 | **(c)** |
| 195 | **(c)**Moist hydrogen cannot be dried over concentrated because it is oxidized byand catches fire.  |
| 196 | **(b)**  |
| 197 | **(d)**  |
| 198 | **(b)**Hydrogen of high purity is obtained by electrolyzing aqueous barium hydroxide in presence of Ni electrodes.  |
| 199 | **(c)**It is a fact. |
| 200 | **(a)**Lighter isotopes are more reactive. |
| 201 | **(c)**Heavy water is used as a moderator to slow down the speed of fast moving neutrons and as well as a coolant |
| 202 | **(a)**  |
| 203 | **(c)**It is fact. |
| 205 | **(c)**Both are V-shaped. |
| 206 | **(c)**No such reaction exists. |
| 207 | **(c)**Potassium reacts violently with acids. |
| 209 | **(c)** |
| 210 | **(b)**It is a fact. |
| 211 | **(b)**It is a fact. |
| 212 | **(c)**Alkaline earth metal salts are causing hardness :Temporary hardness caused by soluble Ca and Mg hydrogen carbonates. Calcium and magnesium soluble sulphates and chlorides cause permanent hardness.  |
| 214 | **(a)**  |
| 215 | **(d)**Electrolysis of 50% sulphuric acid gives per disulphuric acid which on distillation yields 30% solution of hydrogen peroxide |
| 216 | **(b)** |
| 217 | **(d)**Ionic hydrides give basic solution when reacts with water *e.g.,*  |
| 218 | **(b)** |
| 219 | **(b)**  |
| 220 | **(a)**hydrogen show different spin in a hydrogen molecule, hence, these are not the isotopes |
| 221 | **(d)**10 volume =1 volume of gives 10 volume of at NTP.At NTPsolution containssolution contains Strength of 10 volume  |
| 222 | **(a)**Bond formation is exothermic. |
| 223 | **(a)**Ortho-hydrogen is more stable and para form always try to convert in ortho form. |
| 224 | **(a)**These are facts. |
| 225 | **(d)**  |
| 226 | **(a)** |
| 227 | **(b)** |
| 228 | **(a)**It is a fact. |
| 229 | **(c)**Hydrogen peroxide oxidise lead sulphide into lead sulphate which is a solid.  |
| 230 | **(b)** |
| 231 | **(d)** is oxidised by PbS is oxidised by to KI is oxidised by  cannot be oxidised by but it is reduced to by  |
| 232 | **(b)** |

|  |  |
| --- | --- |
| 233 | **(c)**Industrial preparation of :(A) **By the electrolysis of 50 %**  50 % solution is electrolyzed at 0 between Pt electodes. The perdisulphuric acid is formed. **At Anode ;** **At Cathode ;** The obtained perdisulphuric acid gives on hydrolysis. This is separated by distillation at reduced pressure and thus, 30 % solution of is obtained. (B) **By the auto-oxidation of 2-ethyl-anthraquinol (Modern method) :** Anthraquinol, in a mixture of benzene and *n*-heptanol on treatment with air gives and 2-ethyl-anthraquinone. This 2-ethyl-anthraquinone on hydrogenation gives 2-ethyl-anthraquinol in presence of Pd catalyst.It is a cyclic process and in it only is consumed, 2-ethyl-anthraquinone is reobtained during reaction.   |

|  |  |
| --- | --- |
| 235 | **(b)**   |
| 236 | **(d)** |
| 237 | **(a)**Tritium is a heavy isotope of hydrogen which is obtained by nuclear reactions. |
| 238 | **(b)**It is a fact. |
| 239 | **(a)** |
| 240 | **(b)** |
| 241 | **(c)**It resemble with alkali metals as it forms ion by losing its outer electron and resemble with halogen as it forms ion by gaining one electron. |
| 242 | **(a)**Zinc, does not react with cold water.  steam |
| 243 | **(a)**The angle in water molecule is about (due to two lone pairs of electrons) |
| 244 | **(c)**Some transition metals such as Pt, Ni, Pd, Os, Cr, Mn, Fe, etc., adsorb relatively large amount of hydrogen gas, which is called occluded hydrogen. |
| 245 | **(d)**Chlorine has lone pair which it can donate to form coordinate bond while hydrogen cannot |
| 246 | **(b)**Metals in finely divided state possess larger surface area and are more reactive. |
| 247 | **(d)**During the softening process the reaction takes place as :After sometime, the zeolite is completely converted into calcium and magnesium zeolites. Eventually, the bed ceases to soften water *i.e.,* it gets exhausted. At this stage, the supply of hard water is stopped and the exhausted zeolite is reclaimed by treating the bed with a 10% NaCl solution (Brine soln.) when the following reaction takes place Reclaimed zeolite |
| 248 | **(b)**Volume strength  |
| 249 | **(a)**Follow reactive nature of nascent hydrogen. |
| 250 | **(a)**It is a fact. |
| 251 | **(d)** |
| 252 | **(a)** does not give on hydrolysis. Rest all contains O—O bond and gives on heating.  |
| 253 | **(d)**= 0, *p* =1, = = 0 |
| 254 | **(a)**  |
| 255 | **(a)**Permutit or zeolite is the aluminosilicate of sodium. It is used to remove hardness of water. It converts insoluble salts of and into soluble zeolites. It exchange these ions with and water becomes soft.Thus, exhausted permutit does not contain ions.  |
| 256 | **(d)** = = 55.6 |
| 257 | **(d)** +  |
| 258 | **(b)** |
| 260 | **(c)** reduces potassium  |
| 261 | **(d)**Permanent hardness in the name because this type of hardness is not removed by only boiling the water. |
| 262 | **(a)** |
| 263 | **(b)**Heavy water is formed by the combination of heavier isotope with oxygen. |
| 264 | **(d)**Industrially, hydrogen is prepared from water gas which is a mixture of carbon monoxide and hydrogen, by removing carbon monoxide by Bosch process or by liquefaction.  |
| 265 | **(d)**It is a fact. |
| 266 | **(d)**from the above equation 0.01 moles of PbS required 0.04 mole of  Weight of 0.04 mole  10 volume of means, 1mL of such solution of on decomposition by heat produces 10mL of oxygen at NTP.  decomposes as, Thus 1mL of 10 volume solution containsis present in 1 mL of 10 volume  |
| 267 | **(c)**In this reaction hydrogen peroxide acts as a reducing agent and it reduces ions.  |
| 268 | **(d)**Water is oxidised to oxygen by fluorine as  |
| 269 | **(c)**Hydrogen forms about 75% of the mass (total amount) of the universe. It has been estimated that more than 90% of all atoms in the universe are H-atoms. While most of the remaining atoms are of He. The order of abundance of given elements in the universe is   |
| 270 | **(a)**It is a fact. |
| 271 | **(c)** |
| 272 | **(d)** di-basic acid. |
| 273 | **(d)** |
| 274 | **(c)**Both halogen and hydrogen have one electron short to attain configuration of nearest noble gas. |
| 275 | **(c)** |
| 276 | **(c)** |
| 277 | **(b)**Covalent molecules occupy solid structure due to increasing van der Waals’ forces. |
| 278 | **(a)** —O—O— bond. It is lead dioxide.  |
| 280 | **(d)**It is a fact. |
| 281 | **(c)** |
| 282 | **(d)**In this reaction, works as a reducing agent |
| 283 | **(d)** |
| 284 | **(a)**The reactivity order of isotopes decreases with increase in mass no. |