CHEMISTRY

BOOKS - OMEGA PUBLICATION

HYDROGEN

Questions

1. Write two similarities of hydrogen with alkali metals.

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

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3. Write two similarities of hydrogen with halogens.

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4. Write the names of isotopes of hydrogen. What is the mass ratio of these isotopes ?

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5. Write two dissimilarities of hydrogen with alkali metals.

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6. Write two dissimilarities between hydrogen and halogens.

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7. Give the electronic configuration of various isotopes of hydrogen.

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8. Which isotope of hydrogen does not contain any neutron ?

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9. Which isotope of hydrogen is radioactive in nature ?

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10. Calculate the number of neutrons in the following elements : ${}_{1}^{3}H$

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11. Which of the following is used as moderator in nuclear reactor?

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12. What do you mean by "Isotopic effect" ?

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13. How will you prepare dihydrogen from the metals ?

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14. Give various methods for commercial production of dihydrogen.

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

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16. How will you prepare nascent hydrogen?

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17. How will you prepare atomic hydrogen?

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18. Give preparation of dihydrogen from Lane's process .

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19. Give preparation of dihydrogen from Bosch process.

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20. Can we use concentrated H_2SO_4 in the laboratory preparation of dihydrogen ? If not, then why?

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21. What do you understand by "water gas shift reaction" ?

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22. What do you mean by spin or nuclear isomers of hydrogen ?

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23. Explain ortho and para hydrogens.

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24. How dihydrogen chemically reacts with halogens.

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25. How dihydrogen chemically reacts with dioxygen .

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26. How dihydrogen chemically reacts with metals ?

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27. SO_2 acts as oxidising and reducing agent.

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28. What is hydrolith?

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29. Write short note on hydrogenation of vegetable oils.

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30. What is occlusion and occluded hydrogen ?

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31. Give the different uses of dihydrogen in the industries and laboratories.

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33. Why water is called universal solvent?

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34. Why water is called universal solvent?

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35. Why water is a liquid and hydrogen sulphide is a gas?

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36. Explain why water has high boiling and melting points as compared to H_2S

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37. Among NH_3, H_2O and HF, which will you expect to have highest magnitude of hydrogen bonding and why?

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38. Write structure of antibody molecule.

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39. Explain why ice floats over water.

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40. Give the chemical properties of water.

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41. What do you understand by the term 'auto-protolysis' of water? what is its significance?

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42. What causes permanent hardness of water ?

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43. How can saline hydrides removes traces of water from organic compound?

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44. Taps water is an example of soft water or hard water.

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45. Which of the two, hydrogen or deuterium undergoes reaction more rapidly and why?

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

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47. Give different methods of preparation of hydrogen peroxide.

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48. Give one method of preparation of H_2O_2 .

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49. Give Merck's process for the preparation of H_2O_2

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50. Compare the structures of H_2O and H_2O_2

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51. What is the basicity of H_2O_2 ?

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52. Give the chemical properties of H_2O_2 ?

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53. Define the term-Adaptation?

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54. What happens when H_2O_2 reacts with PbS.

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55. What happens when H_2O_2 reacts with acidified $FeSO_4$

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56. What happens when H_2O_2 reacts with acidified KI .

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57. What happens when H_2O_2 reacts with acidified potassium ferrocyanide.

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58. What happens when H_2O_2 is treated with H_2S ?

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59. How H_2O_2 acts as a bleaching agent ?

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60. What precautions are necessary while storing hydrogen peroxide ?

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61. Explain why hydrogen peroxide is stored in coloured plastic bottles ?

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62. Can we store H_2O in ordinary glass bottles ?

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63. Give the various uses of hydrogen peroxide.

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64. What is the trade name of hydrogen peroxide used as an antiseptic ?

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65. What precautions are necessary while storing hydrogen peroxide ?

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66. What does a 20 volume H_2O_2 solution mean?

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67. Write a short note on hydrogen economy.

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68. What are the important advantages of hydrogen as a fuel for rockets?

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69. What are the various problems in using hydrogen as a fuel ?

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Multiple Choice Questions

1. The nuclei of tritium $\left({}_1H^3\right)$` atom would contain neutrons .

A. 1

B. 2

C. 3

D. 4

Answer: B

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2. The lightest element among the following is

A. He

B. Cs

C. H

D. I

Answer: C

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3. The boiling point of heavy water is

A. $100^\circ C$

B. $103.4^\circ C$

C. 101.4°

D. $104^\circ C$

Answer: C

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4. The adsorption of hydrogen by metals is called

A. dehydrogenation

B. hydrogenation

C. occlusion

D. adsorption

Answer: C

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5. Which of the following produces hydrolith with dihydrogen ?

A. Mg

B. Al

C. Cu

D. Ca

Answer: D

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

A. magnesium bicarbonate

B. calcium chloride

C. magnesium sulphate

D. calcium carbonate

Answer: A

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7. Permutit is a technical name given to

A. aluminates of calcium and sodium

B. silicates of calcium and sodium.

C. hydrated silicates of aluminium and sodium

D. silicates of calcium and magnesium

Answer: C

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8. H_2O has structure

A. linear

B. tetrahedal

C. pyramidal

D. bent

Answer: D

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9. Calgon used as water softener is

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

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

C. $Na_2\left[Na^+(PO_4)_5\right]$

D. $Na_4\left[Na_2(PO_4)_6\right]$

Answer: A

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10. The H-O-H angle in water molecule is about

A. 90°

B. 180°

C. 102°

D. 105°

Answer: D

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11. Decomposition of H_2O_2 is prevented by

A. NaOH

B. MnO_2

C. acetanilide

D. oxalic acid.

Answer: C

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12. The structure of H_2O_2 is

A. open book like

B. linear

C. closed book

D. pyramidal

Answer: A

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13. Which of the following acts as both reducing and oxidising agent ?

A. H_2SO_4

B. H_2O_2

C. KOH

D. $KMnO_4$

Answer: B

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14. The percentage by weight of hydrogen in H_2O_2 is

A. 5.88

B. 6.25

C. 25

D. 50

Answer: A

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15. Which of the following is correct for hydrogen?

A. It can form bonds in +1 as well as -1 oxidation state.

B. It is always collected at cathode

C. It has a very high ionization potential

D. It has same electronegativity as halogens.

Answer: A

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16. Ortho and para hydrogen differ

A. in the number of protons

B. in the molecular weight

C. in the nature of spin of protons

D. in the nature of spin of electrons

Answer: C

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17. What is heavy water?

A. H_2O^{17}

B. H_2O^{18}

C. D_2O

D. H_2O

Answer: C

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18. Hydrogen ion H^- is isoelectronic with

A. Li

B. He

C. H^+

D. Li^-

Answer: B

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19. Which isotope of hydrogen is radioactive in nature ?

A. tritium

B. deuterium

C. para hydrogen

D. nascent hydrogen

Answer: A

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20. Ionization energy of hydrogen is

A. equal to that of chlorine

B. lesser than that of chlorine

C. slightly higher than that of chlorine

D. much higher than that of chlorine.

Answer: C

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21. Hydrogen acts as reducing agent and thus resembles

A. halogen

B. noble gases

C. radioactive elements

D. alkali metals

Answer: D

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22. 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

Answer: B

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23. Hydrogen from HCl can be prepared by

A. Mg

B. Cu

C. P

D. Pt

Answer: A

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24. The metal which displaces hydrogen from a boiling caustic solution is

A. As

B. Zn

C. Mg

D. Fe

Answer: B

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25. Hydrogen combines with other elements by

A. losing an electron

B. gaining an electron

C. sharing an electron

D. losing, gaining or sharing of an electron.

Answer: D

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26. Which is poorest reducing agent?

A. nascent hydrogen

B. atomic hydrogen

C. dihydrogen

D. all have same reducing strength

Answer: C

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27. Which of the following hydrogen halide is liquid at room temperature ?

A. HF

B. HCl

C. HBr

D. HI

Answer: A

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28. CaH_2 is an example of

A. ionic hydride

B. covalent hydride

C. metallic hydride

D. none of these

Answer: A

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