

QB365
Important Questions - Hydrogen
11th Standard CBSE

Chemistry

Reg.No. :

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Time : 01:00:00 Hrs

Total Marks : 50

Section-A

- 1) Why does hydrogen occur in a diatomic form rather than in a monoatomic form under normal conditions? 1
- 2) Name the isotope of hydrogen which contains equal number of protons and neutrons. 1
- 3) Which isotope of hydrogen is radioactive? 1
- 4) Name the compound each in which hydrogen exists in positive oxidation state 1
- 5) Arrange H_2 , D_2 and T_2 in the decreasing order of their boiling points 1
- 6) Write one chemical reaction for the preparation of D_2O_2 1
- 7) Why is hydrogen peroxide stored in wax lined bottles? 1
- 8) What type of bonds are broken when water evaporates. 1
- 9) Name one industrial method for the preparation of dihydrogen. 1
- 10) Write the name of that isotope of hydrogen of hydrogen which has no neutron? 1

Section-B

- 11) Find the volume strength of 1.6 N H_2O_2 solution 2
- 12) Complete the following equations $PbS(s) + H_2O_2(aq)$ 2
- 13) Complete the following equations 2
 $MnO_4^-(aq) + H_2O_2(aq) \rightarrow$
- 14) Complete the following reactions. 2
 $CuO(s) + H_2(g) \rightarrow$
- 15) Complete the following reactions. 2
 $CH_4(g) + H_2O(g) \rightarrow$
- 16) Describe the bulk preparation of hydrogen by electrolytic method. What is the role of an electrolyte in this process? 2
- 17) How does the atomic hydrogen or oxy-hydrogen torch function for cutting and welding purpose? Explain. 2
- 18) What properties of water make it useful as a solvent? What type of compounds can it dissolve 2
- 19) Calculate the concentration in g/L of a 20 volume H_2O_2 solution 2
- 20) Explain why HCl is a gas and HF a liquid? 2

Section-C

- 21) At the home of Mr.Kumar, Dalda ghee is generally used. He is suffering from high blood pressure and diabetes. Mr.Sharma, a friend of Mr.Kumar has advised him to change from ghee to vegetable oil like mustard oil. Dihydrogen (H_2) is used in the manufacture of vanaspati ghee by hydrogenation of polyunsaturated vegetable oils using nickel as a catalyst.
- $$\text{Vegetable oil} \xrightarrow[\text{H}_2]{\text{Ni}} \text{vanaspati ghee}$$
- What values are shown by Mr.Sharma.
- 22) Scientist of UK has designed the cars, working on hydrogen fuel cells instead of petrol engines. Here hydrogen is used as sources of electrical energy i.e. a reaction of hydrogen and oxygen is used to generate electrical energy. It has many advantages over the conventional fossil fuels and electric power generation. What is the efficiency of the fuel cell as the comparison to other conventional fuels?
- 23) How would you prepare dihydrogen from water by using a reducing agent?
- 24) Give ion electron equations for the following reactions.
- Reduction of acidified potassium dichromate solution

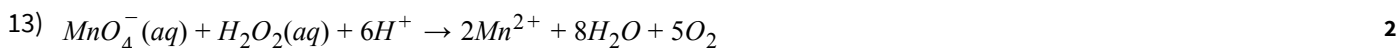
Section-A

- 1) Hydrogen atom has only one electron in its 1s-orbital. So, to achieve stable inert gas configuration of helium, it exists as diatomic molecule and is called dihydrogen. 1
- 2) Deuterium (2_1H) Number of protons (p)=number of electrons =atomic number=1 Number of neutrons (n)=Mass number - atomic number = 2-1=1 1
- 3) Tritium 1
- 4) HCl, here oxidation state of hydrogen is +1. 1
- 5) $T_2 > D_2 > H_2$ 1
- 6) D_2O_2 is prepared by distillation of potassium persulphate ($K_2S_2O_8$) with D_2O .

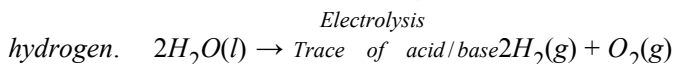
$$K_2S_2O_8 \text{Potassium persulphate} + 2D_2O \xrightarrow{\text{Distillation}} D_2O_2 + 2KDSO_4$$
 1
- 7) Hydrogen peroxide is decomposed by rough surfaces of glass, alkali oxides present in it and light to form H_2O and O_2 . $2H_2O_2 \rightarrow 2H_2O + O_2$ To prevent this decomposition, H_2O_2 is usually stored in coloured paraffin wax coated plastic or teflon bottles. 1
- 8) Intermolecular hydrogen bonds are broken when water evaporates 1
- 9) Bosch process 1
- 10) 1

Section-B

- 11) 27.2 g/L 2



16) Electrolysis of acidified water using platinum electrodes gives 2



17) 2

Atomic hydrogen atoms, produced by dissociation of dihydrogen with the help of an electric arc, are allowed to recombine on the surface to be welded. In this process, a large amount of energy is liberated which is used to generate a temperature of 4000 K for cutting and welding purpose in the form of atomic hydrogen or oxy-hydrogen torches.

18) 2

High dipole moment and high dielectric constant, these are the two properties of water which make it useful as a solvent

It can dissolve both ionic compounds as well as those covalent compounds which can form hydrogen bonds with water such as ethyl alcohol, sugar, glucose etc.

19) 59.91 g/L 2

20) 2

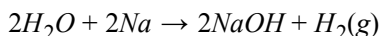
F is a smaller and more electronegative than Cl, so it forms stronger H-bonds as compared to Cl. That's why HF is liquid and HCl is a gas.

Section-C

21) Mr.Sharma is caring, knowledgeable and helping person. 5

22) The efficiency of fuel cells is 70% whereas other conventional cells are only 40% efficient. 5

23) sodium metal is a good reducing agent.It reduces water to hydrogen(or dihydrogen) 5



24) 5

