TENDER HEART HIGH SCHOOL, SEC-33B, CHD

CLASS- VIII
CHAPTER-6

SUBJECT- CHEMISTRY
TEACHER- ANAMIKA

Good morning to all the students!

Students this lesson is of class - VIII for the subject of chemistry. Topic:- 'Position of hydrogen in Periodic Table' which is covered in chapter-6. 'Study of the first element - Hydrogen' Starting on page no - 96 of your text book titled - consise chemistry by 'Selina Publication' and is being submitted to you on 14, July 2024

All students may now please open page no - 96 of your notebook in front of you.

If all students are ready then let us start with this chapter. All students may now please listen carefully.

Hydrogen molecule

Symbol = H
Molecular formula = H_2
Valency = 1
Relative atomic mass = 1
Relative molecular mass = 2
Atomic number = 1
Electronic configuration : 1 (K shell)
Position in Periodic Table: 1st Period; 1A Group (P. T. O)

CLASS- VIII SUBJECT- CHEMISTRY
CHAPTER- 6 TEACHER- ANAMIKA

Position Of Hydrogen In Periodic Table

Hydrogen is the first element in the periodic table. Its atomic number is 1, and it has only one electron in its valence shell. Therefore, it belongs to the first group and the first period of the periodic table.

It is expected that the properties of hydrogen should be similar to those of the other members of the 1st group, but this is not the case. Ever since Mendeleev presented his periodic table, the position of hydrogen in the table has been a matter of controversy and debate. This is mainly because some of the properties of hydrogen resemble the properties of the Group I elements (alkali metals) while others are similar to those of the Group -17 (halogens) elements.

Note it:- Hydrogen shows a dual nature since it resembles the alkali metals of Group IA and the halogens of Group VII A (17).

Students, next we will discuss 'Similarities Between Hydrogen And Alkali Metals'.

(P.T.O)

CLASS- VIII SUBJECT- CHEMISTRY

CHAPTER- 6 TEACHER- ANAMIKA

Similarities Between Hydrogen And Alkali Metals:-

1. Electronic configuration:-

They have only one electron in their outermost orbits.

	K	L	M	N	O	P	(Shells)
H(1) :	1						
Li(3) :	2,	1					
Na(11) :	2,	8,	1,				
K(19) :	2,	8,	8,	1,			
Rb(37):	2,	8,	18,	8,	1,		
Cs(55):	2,	8,	18,	18,	8,	1	
Fr(87):	2,	8,	18,	32,	18,	8,	1

2. Valence electrons:-

All elements have one electron in their outermost shell, i.e. their valency shell and so all of them have one valence electron.

3. Valency:- All alkali metals, including hydrogen, have valency 1.

4. Ion formation:- Each of them can form cation, i.e. positive ion, by loss of an electron

(P.T.O)

$H \rightarrow H^+ + e^-$
$Li \rightarrow Li^+ + e^-$
$Na \rightarrow Na^+ + e^-$

As such all these elements have electropositive character.

5. Reducing power :- Both the alkali metals and hydrogen act as reducing agents.

$CuO + H_2 \rightarrow Cu + H_2O$
$CuO + 2Na \rightarrow Cu + Na_2O$

6. Burning :- Hydrogen burns in oxygen to form its oxide (water).

$2H_2 + O_2 \rightarrow 2H_2O$

Hydrogen burns with a pop sound.
Alkali metals also burn vigorously when heated in oxygen to form their respective oxides.
Lithium forms monoxide.

$4Li + O_2 \rightarrow 2Li_2O$.

Sodium and hydrogen form peroxide.

$2Na + O_2 \rightarrow Na_2O_2$
$H_2 + O_2 \rightarrow H_2O_2$

while potassium, rubidium and caesium form superoxides having the general formula MO_2 (where M stands for metal).

$K + O_2 \rightarrow KO_2$

(P.T.O)

CLASS- VIII SUBJECT- CHEMISTRY

CHAPTER- 6 TEACHER- ANAMIKA

7. Combination with non-metals :-

Hydrogen as well as alkali metals react with non-metals like oxygen, sulphur and chlorine to form respective compounds.
Hydrogen - forms H_2O ; H_2S ; HCl
Sodium - forms Na_2O ; Na_2S ; NaCl and so on.

Students, now we will discuss the next topic of this chapter which is 'Similarities between hydrogen and halogens'.

Similarities Between Hydrogen and Halogens:

1. Electronic configuration :- Hydrogen and halogens have one electron less than the nearest inert gas.
   H = 1 [He = 2],
   F = 2, 7 [Ne = 2, 8],
   Cl = 2, 8, 7 (Ar 2, 8, 8)

2. Valency :- Both have valency 1.

Thus, they accept one electron to attain the electronic configuration of the nearest inert gas

3. Formation of ions :- Both show a tendency to form anions since they are one electron short of the nearest inert gas configuration.

(P.T.O)

CLASS- VIII SUBJECT- CHEMISTRY
CHAPTER- 6 TEACHER- ANAMIKA

$H + e^- \rightarrow H^-$
$Cl + e^- \rightarrow Cl^-$

4. Electronegative character:- Both halogens and hydrogen are non-metals. They show electronegative character.
$H + e^- \rightarrow H^-$
$F + e^- \rightarrow F^-$

5. Physical State:- Like halogens (fluorine and chlorine), hydrogen too is a gas.

6. Atomicity:- Hydrogen as well as halogens exist in the form of diatomic molecules (H_2, F_2, Cl_2, Br_2, I_2).

Now, I will give you three short questions. You will get a three minutes break to write the answers.

The Questions are:-

Q1:- What is the position of Hydrogen atom in the periodic table?

Q2:- Hydrogen burns with a _____ sound.

Q3:- What is the atomicity of Hydrogen as well as halogens.