

GIRLS' HIGH SCHOOL AND COLLEGE

2020-2021

Class XII A & B

CHEMISTRY

WORKSHEET NO. – 4

Note: - Parents please ensure that your ward refers to the given reference books and website at least for two days.

Reference Books – Nootan ISC Chemistry- Vol II Class XII - H.C. Srivastava

ISC Chemistry Vol II Class XII - K.L. Chugh

Website – www.wikipedia.org

www.studiestoday.com

www.khanacademy.org

Chapter- p-block Elements

Topic- Group 17 & 18 elements

Group 17 of the periodic table consists of Fluorine, Chlorine, Bromine, Iodine and Astatine. They are collectively known as halogens meaning salt producer. Astatine is a radioactive element and are highly reactive. Halogen atom possesses electronic configuration of the type ns^2np^5 , thus each halogen atom is short of one electron to attain the nearest noble gas configuration. Ionisation energy and electronegativity decreases on moving down the group. Atomic and ionic radii, density, melting and boiling points increase on moving down the group. The atomic radius of a halogen atom is the smallest in its period. Halogens have high value of electron affinity. The electron affinity of Fluorine is lower than that of Chlorine. Fluorine only exhibits -1 oxidation state in all its compounds. The other halogens exhibit -1, +1, +5 and +7 states in their compounds. All the halogens are coloured. The colour darkens on moving down the group. The reactivity of halogens decreases on moving down the group. All halogens combine with hydrogen to form hydrogen halides. The oxides of halogens are powerful oxidizing agents and decompose with explosive violence on being heated.

Group 18 of the periodic table consists of Helium, Neon, Argon, Krypton, Xenon and Radon. These are known as noble gases. All the noble gases are mono atomic and are devoid of chemical reactivity under ordinary conditions. All the noble gases possess very stable electronic configuration. The atomic radii of noble gases are van der Waals' radii and are larger

than the atomic radii of corresponding elements of group 17. The atomic radii, melting and boiling points, solubility in water and liquefaction tendency of noble gases increases on moving down the group. Ionisation energy of noble gases decreases on moving down the group. The solubility of noble gases in water is due to dipole-induced dipole interaction. Due to stable electronic configuration the electron gain enthalpy values for noble gases are positive.

Questions:

Q1). Answer briefly:

- i). What is aqua regia? Why gold dissolves in aqua regia?
- ii). Why is HF not stored in plane glass bottle
- iii). In spite of nearly same electronegativity oxygen forms hydrogen bond while chlorine does not.
- iv). How would you justify the inclusion of group 18 in between group 17 and group 1 in the periodic table?
- v). What are interhalogen compounds? How are they classified?

Q2). For the molecule IF_5 :

- i). Draw the structure of the molecule.
- ii). State the hybridisation of the central atom.
- iii). State the geometry of the molecule.

Q3). Give balanced chemical equations for the following:

- i). Chlorine gas is passed through cold dilute sodium hydroxide.
- ii). Action of heat on a mixture of sodium chloride and concentrated sulphuric acid.
- iii). Chlorine with excess of ammonia.
- iv). Hydrochloric acid and calcium carbonate.
- v). Chlorine with H_2S .

Q4). Draw the structure of

- a). Xenon tetrafluoride

b). Xenon hexafluoride

i). State the hybridization of the central atom of the above two molecules.

ii). Geometry of the molecules.

Q5). Discuss the following properties and their variation with reference to the elements of group 17.

i). Reactivity.

ii). Oxidising nature.

iii). Acidic nature of oxoacids.

Q6). Account for the following: -

i). Negative electron gain enthalpy of fluorine is lower than that of chlorine.

ii). Halogens are coloured and the colour deepens on moving down the group.

iii). HI in aqueous solution is a stronger acid than HCl.

iv). Boiling point of HF is higher than that of HCl.

v). Among halogens fluorine provides largest variety of inter halogens compounds.

vi). ICl is more reactive than iodine.

vii). Helium is used for filling weather balloons.

viii). Neon does not form compounds analogous to those formed by Xenon.

ix). Iodine exhibits a slight metallic character.

x). Argon has high ionisation energy.

Q7). Name the inert gases used for

i). Filling sodium vapour lamps.

ii). Obtaining light of different colours in neon signs.

iii). Treatment of cancer.

iv). Cosmic ray measurement.
