UNIVERSITY OF BALOCHISTAN QUETTA
BA/BSc EXAMINATION (ANNUAL) 2018.

Attention:- 1- Possession & Use of mobiles & other electronic accessories are strictly prohibited . If any one possess / uses , his /her case will be sent to unfair means committee.

2- If any candidate show / Marks his / her identity in the answer book , he / she will be disqualified for the said paper .

Subject:- **CHEMISTRY.** **B.**

Time Allowed :- 3 Hours Max : Marks : 50

Note :- ATTEMPT ANY FIVE QUESTIONS . ALL QUESTIONS CARRY EQUAL MARKS.

Q.1. Give brief answer of following :

a. Why Ionization energies decrease down the group.
b. Why the positive charge ions are mostly smaller in size than neutral atoms.
c. How does electronegativity difference decide the nature of ionic Bond.
d. Determine the period and group of oxygen with the help of electronic configuration (At.no. of oxygen =8) .
e. What is reducing agent.

Q.2. Write the main point of M.O.T also determine the Bond order of H_2 and N_2 with the help of M.O.T .

Q.3. Write main point of crystal field theory (C.F.T) . Also explain chelates.

Q.4. What are buffers. Give their composition, also discuss application of buffers.

Q.5. a) Write General properties of Boron and Aluminum .
b) Write the application of inert Gases

Q.6. Define interhalogen, write their types and explain Xx_5 type of interhalogens .

Q.7. a) Explain law of mass action .
b) Write uses of common ion effect.

Q.8. a) Describe the chemistry of alums.
b) Define "Hypo" . Give its application in Photography.

Q.9. Define Glass. Explain manufacturing of Glass.

Q.10. Write short note on any two of the following : -

a) Solar cell.
b) Liquid crystals.
c) Dipole moment.
d) Silicones.

UNIVERSITY OF BALOCHISTAN, QUETTA.

Code No.

Name of Examination

Group ——— Evening / Morning ———

Subject. ———

Paper. ———

Date. ———

Number of Continuation Sheets attached (if enclosed)

Grand total (in figures)

Grand total (in Words)

NOTE: Candidates are warned that if the particulars required above are not correctly supplied this Answer book will not be examined

Signature of Head Examiner

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Question No.	Marks Obtained
1	
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Grand Total	

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Code No.

Name of Examination. B.Sc. Annual (2018)

Group 1st

Subject "CHEMISTRY"

Paper "B"

Date 15th October 2018

Examination Centre Govt. Girls Degree Clg Qta Comit (2).

Number of continuation Sheets attached (if enclosed) 05

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CHEMISTRY 1B.

Q NO 2:- Write the main points of M.O.T and also determine the Bond order of H_2 and N_2 with the help of MOT ?

Answer:- **MOLECULAR ORBITAL THEORY:-**

The theory which was presented to determine the bond between molecule and tells about the bond order, and gives concept of paramagnetism and diamagnetism is known as molecular orbital theory (M.O.T).

STATEMENT:-

Molecular orbital theory states that :-

"When two atomic orbitals merge or overlap each other of different energies then they tend to give two molecular orbitals, one is antibonding molecular orbital and the second is bonding molecular orbital."

EXPLANATION:-

Molecular orbital theory (M.O.T) is one of superior theory known. It gives the concept of bonding between the atoms in a molecule. M.O.T also tells about the shape or geometry of molecules. These molecules are formed by the coordinate covalent bond, means that shared electron pair was given or donated

by just one atoms of the two. The molecular orbital theory also tells the contribution of orbitals in those molecules which are homoatomic mostly.

POSTULATES OF MOLECULAR ORBITAL THEORY (MOT) :-

The main postulates and essential features are described as follows:-

1) The molecular orbitals are of two types:
   i) Antibonding molecular orbitals (ABMO).
   ii) Bonding molecular orbitals (BMO).
2) Electrons first enter in the orbital of lower energy level of higher stability, then goes to levels of

higher energy.

3- Each bonding orbital must have at the extent of two electrons.

4- The electrons in molecular orbitals must be in opposite spin.

5- While the filling of orbitals Pauli's exclusion principle should be followed.

6- The electrons that are present in lower energy states tend to occupy the non-bonding orbitals.

7- The non-bonding orbitals usually donot contribute in the formation of molecular orbitals.

8- This theory is successful for explaining the behaviour of elements as they are

paramagnetic or diamagnetic.

9- The concept of bonding between similar atoms (H_2, Li_2, O_2, etc) clears from this theory concept.

10- Bonding orbitals of lower energy should be occupied first by the electrons in an atomic orbitals.

CONCEPT OF PARAMAGNETISM & DIAMAGNETISM:-

→ **PARAMAGNETIC SUBSTANCES:-**

"The substances that are attracted towards by the magnetic field are called paramagnetic".

REASON:- The behaviour of such substances is due to presence of lone pair of electrons.

DIAMAGNETIC SUBSTANCES:-

"The substances which are not attracted by magnetic field are called diamagnetic". They may even slightly repelled by magnetic field.

REASON:- Due to absence of lone pair of electrons. All the electrons are paired in diamagnetic substances.

BOND ORDER:-

The bond order of molecule or atom is the difference between the election pairs in anti bonding molecular orbital (ABMO) and bonding molecular orbital (BMO).

FORMULA:-

Following two formulas can

be used to determine the bond order:

(1) Bond order = No. of e^- pair in ABMO − No. of e^- pair in BMO

(2) Bond order = (e^-s in ABMO − e^-s in BMO) / 2.

APPLICATIONS of M.O.T :-

Molecular orbital theory is used to determine the bond order of certain substances. Following are the examples of formation of the elements along with their bond order :-

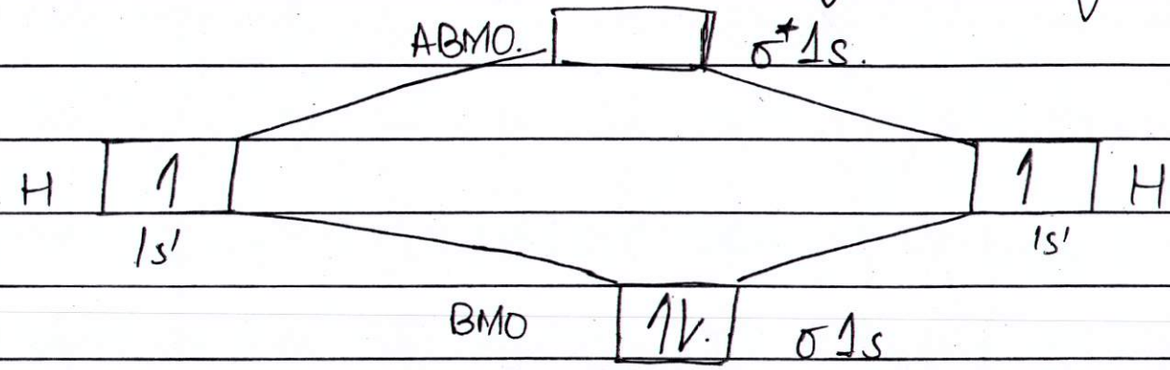
(1) FORMATION OF H_2 :-

Hydrogen molecule is formed by combination of two hydrogen atoms $H + H \longrightarrow H_2$.

Electronic configuration of H:-

$H = 1s^1$.

Molecular orbital Diagram for H_2 =



Bond order of H_2:-

B.O = # of e⁻ pairs in BMO - # of e⁻ pair in ABMO.

B.O of H_2 = 1 - 0

= 1.

OR

$$B.O = \frac{\#\text{ of } e^-\text{s in BMO} - \#\text{ of } e^- \text{ in ABMO}}{2}$$

$$B.O_{H_2} = \frac{2-0}{2} = \frac{2}{2}$$

$$\boxed{B.O_{H_2} = 1}$$

Diamagnetic :-

Hydrogen is diamagnetic, i.e not attracted by magnetic field. It is because it doesnot contain any lone pair of electrons.

(ii) MOLECULAR ORBITAL DIAGRAM OF N_2 :-

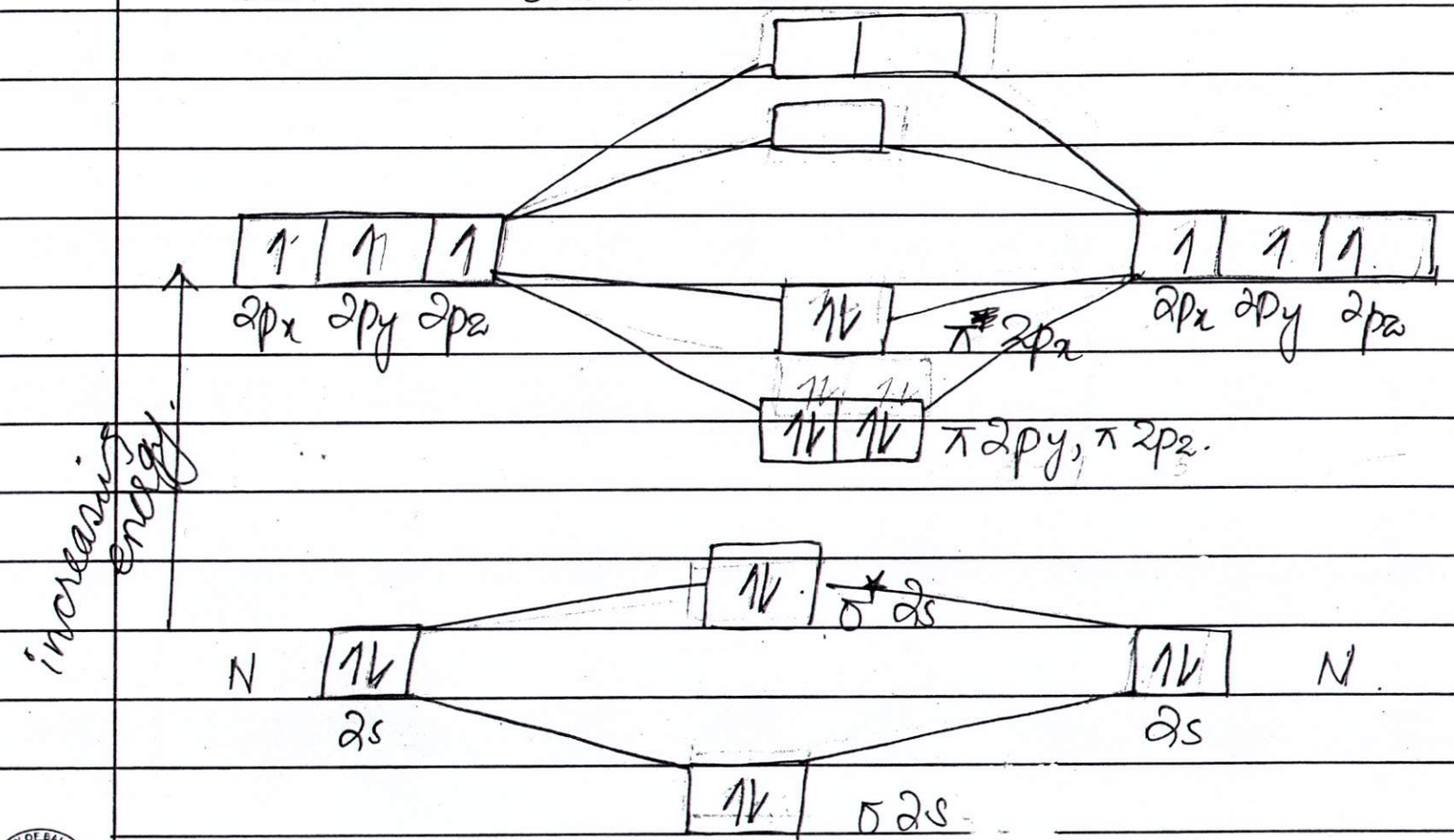
$$N + N \longrightarrow N_2.$$

Electronic configuration :-

$$_7N = 1s^2\ 2s^2\ 2p^3.$$

$$= 1s^2\ \underbrace{2s^2}_{\text{lone pair}}\ \underbrace{2p_x^1\ 2p_y^1\ 2p_z^1}_{\text{Bond pairs}}.$$

Molecular orbital diagram of N_2 can be drawn as:-



Bond order of N_2:-

$\Rightarrow$ B.O = # of $\bar{e}$ pair in BMO − # of $\bar{e}$ pair in ABMO

$B.O_{N_2} = \frac{4-1}{}$

$\boxed{B.O_{N_2} = 3.}$

We can also find by another formula:-

$\Rightarrow$ $B.O = \frac{\text{\# of } \bar{e}\text{'s in BMO} - \text{\# of } e^- \text{ in ABMO}}{2}$

$B.O \text{ of } N_2 = \frac{8-2}{2}$

$= \frac{6}{2} = \frac{6}{2} 3.$

$\boxed{B.O_{N_2} = 3.}$

It shows that nitrogen can form three coordinate covalent bonds.

Order of Increasing energy in Bonding orbitals :-

The orbitals are filled according to their increasing energy. This order is as =

$$\sigma 1s < \sigma^* 1s, \ \sigma 2s < \sigma^* 2s < \pi 2p_x < \pi 2p_y = \pi 2p_z < \pi^* 2p_x < \pi^* 2p_y = \pi^* 2p_z.$$

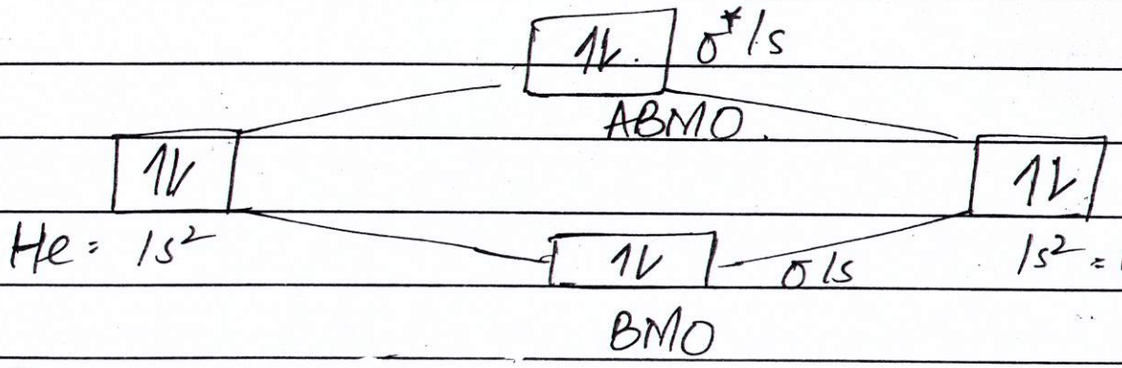
Diamagnetic Behaviour of N_2 :-

It can be assumed from molecular diagram of nitrogen that it is 'diamagnetic' because it doesnot have any lone pair in orbitals.

OTHER EXAMPLES :-

iii) M.O diagram for He :-

$He_2 = 1s^2$.



⇒ Bond order :- 1 - 1

$B.O_{He} = 0$.

⇒ It shows that helium doesnot form any bond and is noble gas, inert gas.

→ Helium also act as diamagnetic substance : i.e not attracted by magnetic field.

Q#04:- What are buffers. Give their composition, also discuss applications of buffers?

Answers:-

BUFFERS:-

Buffer can be defined as: "Substances that resist change in their pH when slight amounts of acid or base are added into them are called buffers."

BUFFER SOLUTIONS:-

"Those solutions which are capable of resistance in change of their pH due to addition of small amounts of acid or bases are said

To be buffer solutions."

EXPLANATION:-

There are certain compounds that are capable to overcome the changes in their pH (hydrogen ion concentration) which may alter to give an acidic or basic solution. Such substances that resists the change, i.e donot change their pH to greater extent are buffers. They react with the substance (acid or base) and yield their appropriate or corresponding weak acids or bases (weak bases). This results in the change which cannot give much hazardous effect to the solution, i.e solution remains as it is, provided that acid/base added in small quantity.

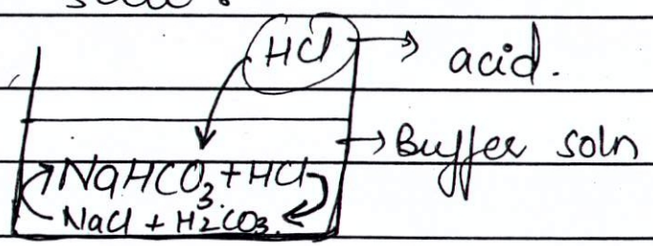
EXAMPLES:-

Some of buffers commonly used are :-

1- Sodium bicarbonate ($NaHCO_3$)
2- Ammonium carbonate (NH_4CO_3).

→ Addition of Acid to $NaHCO_3$:-

When to the buffer solution of sodium bi-carbonate, we put slight amount of acid, say HCl (hydrochloric acid), then reaction proceeds. We got the products= a weak acid and neutral compound, that is salt.



Reaction :-

The reaction between sodium bicarbonate and hydrochloric acid will be:-

$$NaHCO_3 + HCl \longrightarrow H_2CO_3 + NaCl.$$

"H_2CO_3 = Carbonic acid :- weak acid.

NaCl = Sodium chloride :- Neutral salt."

→ Addition of Base to $NaHCO_3$:-

If we add slight quantity of some base, such as sodium hydroxide (NaOH) to the buffer solution containing $NaHCO_3$, then weak base and water will be formed.

$$NaHCO_3 + NaOH \rightleftharpoons Na_2CO_3 + H_2O$$

Reaction :-

The reaction will proceed as follows:-

$$NaHCO_3 + NaOH \longrightarrow Na_2CO_3 + H_2O$$

- Na_2CO_3 = Sodium carbonate.
- H_2O = Water = Neutral compound.

So it is concluded that if we add acid or base, under the conditions that it should be added in small quantity, then the pH of solution (buffer solution) does not change. Such solutions are useful for many life purpose. Its applications are as follows:-

COMPOSITION OF BUFFERS:-

The buffers are composed of "weak acid and strong base" OR "strong base with weak acid."

→ Strong base should have conjugate acid with it.

→ Strong acid should gave the corresponding conjugate base.

Reaction during Buffer formation:-

Following buffers are produced by certain reactions =

1 $NaHCO_3$:-

When strong base ($NaOH$) reacts

with weak acid (H_2CO_3).

$$NaOH + H_2CO_3 \longrightarrow NaHCO_3 + H_2O$$

2) NH_4CH_3COO :-

Reaction of strong base (NH_3) with weak acid (CH_3COOH) gave buffer solution.

$$NH_3 + CH_3COOH \longrightarrow NH_4CH_3COO$$

APPLICATIONS OF BUFFER :-

Buffers are used in daily life for certain important purposes. Some of their applications are as follows:-

1) Laboratory Use :-

Buffer solutions hold an important place in laboratory. Certain reactions need their contribution, in order to maintain pH.

2) Biological Study :-

Bacterial nature can be grown only on buffer solution, which resists change in pH when acid or base are added. So, the buffers also hold an immense importance in biological studies.

3) Industrial Purposes :-

Buffers have also been used industrially. They are

important constituents of cement, concrete, building materials, etc.

4) Human Blood:-

Human blood also contain buffers that maintain its pH. The pH of blood is around 7.5-7.6 in humans. A slight change in pH cause serious effects / diseases in human beings. Human blood has buffer = "$NaHCO_3$" which maintain its pH. → If acid is added and cause pH < 7.5, then "acidosis" may occurs and convulsions cause serious effects.

→ If base is added and pH increases, i.e pH > 7.6 then "alkalosis" occurs.

Hence buffers are important in many aspects. Apart from above mentioned many other applications are also there.

5- Buffers are used in preparation of acids and bases.

6- The change in buffer is only due to excesive amounts of acids or base so they use widely in preparation of certain chemicals.

7- In fiber industries, for making ropes, fibers, chains they may used.

8- In certain reseach techniques, the buffers play an important role.

Q#05 (a) Write General properties of Boron and aluminium?

Answer:- BORON:-

Boron belongs to group IIIA (3) of periodic table. It is the head element in its group. It is present in period 2.

Boron has five electrons, which can be accomodated as:

$_5B = 1s^2, 2s^2 2p^1$.

ALUMINIUM:-

Aluminium is second member of group IIIA (3). It belongs To third period of periodic table. Aluminium contains 13 electrons, having

following configuration =

$_{13}Al = 1s^2, 2s^2, 2p^6, 3s^2, 3p^1.$

GENERAL PROPERTIES OF BORON & ALUMINIUM:-

Boron (B) and aluminium (Al) have following properties:-

1) Electronic configuration:-

Their outer most shell configuration is:-

$[ns^2\ np^1]$

For Boron: $n = 2$ i.e $1s^2, 2s^2 2p^1$.

For Al: $n = 3$, i.e $3s^2 3p^1$.

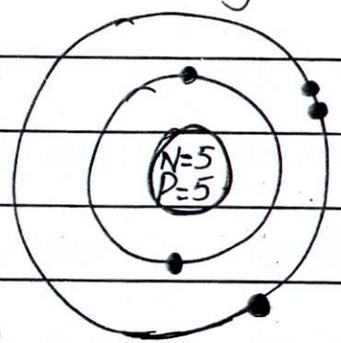
2) GROUP POSITION:-

Boron and aluminium are present in group IIIA of the

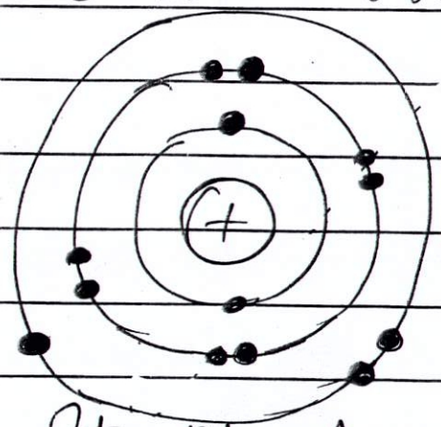
periodic table. It means that they can have three electrons in their outermost shell.

3) PERIODS:-

Boron is included in second period showing that it has 2 shells, whereas Aluminium is in 3rd period, elaborating that it contain three shells.



St. of Boron.



St. of Aluminin

4. VALENCY:-

"The number of outer shell elections in an element is equal to its valency."

The valency of Boron and aluminum is equal, i.e [3].

5) OXIDATION STATES-

"The apparant charge on an atom in a molecule is called as oxidation state."

Both Boron and aluminium have the most common oxidation state of [+3].

e.g = BCl_3, BH_3, etc.
$AlCl_3$, $Al(OH)_3$, etc.

6) CONDUCTIUITY:-

Boron and aluminium are "good conductors", i.e they can pass electric charge due to presence of lone pair of electrons, in molten state.

7) NATURE:-

Boron and aluminium are involved in "alkalin earth metals." They have certain metallic characteristics.

8) ELECTROPOSITIVES:-

They are electroposi-tive, i.e able to donate or give up electrons and attain positive charge.

9) ELECTRON AFFINITY:-

The ability to gain

an electron is called electron affinity."
Boron and aluminium have low electron affinity. They donot gain the electrons.

10) IONIZATION POTENTIAL :-
"The amount of energy ~~required~~ released when an electron is added is called ionization potential.
B and Al have high ionization potentials or ionization energy.

11) SALTS OF BORON & ALUMINIUM :-
Salts of Boron are called "borates". Borates are relatively unstable.
Salts of aluminium are called "aluminates". They are stable.

12:- OXYACIDS OF B & Al:-

Oxyacids of boron are called boric acids, having formula (H_3BO_3). Acids of aluminium doesnot exist.

13:- HALIDE FORMATION:-

When boron and aluminium are reacted with halogen then respective halides are produced. The reaction proceed as:-

Boron Trihalides:-

$$2B + 3Cl_2 \longrightarrow 2BCl_3$$

$$2B + 3F_2 \longrightarrow 2BF_3$$

Aluminium Trihalides:-

$$2Al + 3Cl_2 \longrightarrow 2AlCl_3$$

$$2Al + 3Br_2 \longrightarrow 2AlBr_3$$

14- HYDRIDES OF B & Al :-

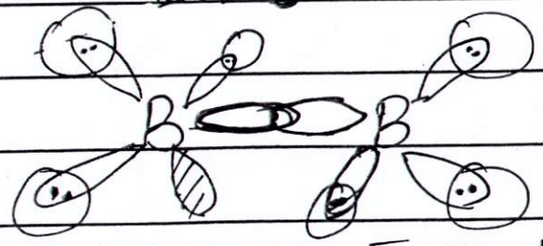
Boron and aluminium react with hydrogen, to give hydrides.

→ Hydrides of Boron :-

$$2B + 3H_2 \longrightarrow 2BH_3$$

$$BH_3 + BH_3 \longrightarrow B_2H_3$$

Diboranes :- B_2H_6

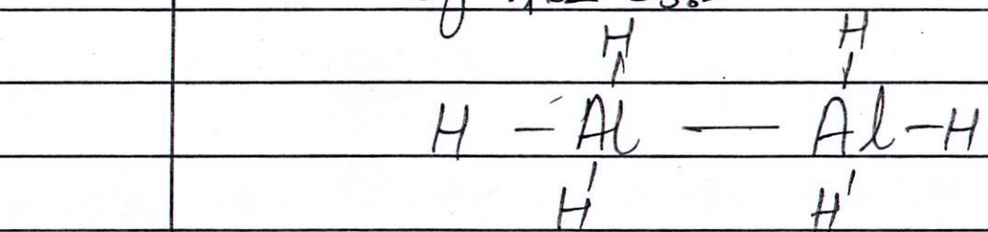


This bonding is called as "banana bond"

→ Hydrides of Al :-

Aluminium gaves AlH_3 and Al_2H_3.

St. of Al_2O_3:-



This type of structure is called dimer.

→ Aluminium exist in dimeric form.

15- REACTION WITH METALS:-

Boron and aluminium show reaction with metals (Alkali metals) showing their oxidation state of +3. The reaction can be as follows:-

$$2B + 6Li \longrightarrow 2BLi_3$$

$$2Al + 6Li \longrightarrow 2AlLi_3.$$

(b) Write down applications of inert gases?

Answer:- INERT GASES:-

Nobel gases are called inert gases.

These gases donot react or show very slow reactivity under certain conditions so these are called as inert gases. They are present in group VIII A (18) of periodic table.

Noble gases include:

- He (helium) = 2
- Neon (Ne) = 10
- Ar (Argon) = 36
- Kr (krypton) = 54

Xe (xenon).
Rn (Radon).
These were discovered first in the 19th century, and proved to behave as monoatomic gases.

APPLICATIONS OF INERT GASES:- (Noble)

gases or inert gases are found to have following applications :-

1) In fluorescent light:-

The gases, specially neon and xenon are used in fluorescent light. It cause the brighthen or sparkling when heated or provided with energy source.

2) In Aircrafts :-
Due to their inertness noble gases are referred to be useful in aircrafts such as rockets, jack aeroplanes, jet propulsive rockets, etc.

3) In Fire Balloons :-
The fire balloons are filled with helium and neon.

4) In Electric Bulbs :-
Inert gas, such as argon is used in electric bulbs. It prevents the overheating caused by continuous charging of electrons

and also prevent the damage of filament in bulbs.

5) In certain pens :-

Many kinds of invisible pens make use of noble gas. The gas may be xenon. It appears invisible and appears to be seen when illuminated with light.

6) In Diseases :- Medical use) :-

Helium is used to cure respiratory diseases.

7) By sea Divers :-

Helium gas is used by sea divers because of its inertness, in place of nitrogen gas.

Q NO7:- Explain law of mass action.

Answer:- **LAW OF MASS ACTION:-**

The law of mass action can be formulated as:-

STATEMENT:-

"The product of concentration of reactants is directly proportional to the rate at which they combine, and is called equilibrium constant."

OR

"The rate of reaction of reatants is directly proportional to the product of their concentrations, each raised to the power the reactants are used in foward reaction."

OR

"The rate of forward reaction is directly proportional to the concentration of reactants, each raised to power they are used, and rate of backward reaction is directly proportional to concentration of products."

OR

"Equilibrium constant is equal to the product of concentration of products divided by product of concentration of reactants, each raised to power times the reactant or product present in a chemical reaction at equilibrium."

EQUATION / EXPLANATION:-

Consider the following general reaction:-

$$M + N \rightleftharpoons O + P.$$

- Rate of forward reaction:-

$$R_f \propto [M][N] \rightarrow (i)$$

- Rate of backward reaction:-

$$R_r \propto [O][P] \rightarrow (ii)$$

At Rate of forward reaction = Rate of backward reaction.

$$R_f = R_r$$

From eq (i)

$$R_f \propto [M][N]$$

$$R_f = K_1 [M][N]. \rightarrow (iii)$$

(K_1 = proportionality constant)

From eq (ii)

$$R_r \propto [O][P].$$

$$R_r = K_2 [O][P]. \rightarrow (iv)$$

Combining eq (iii) & (iv)

$$R_f = R_r$$

$$K_1 [M][N] = K_2 [O][P].$$

$$\frac{K_1}{K_2} = \frac{[O][P]}{[M][N]}$$

Putting $K_1/K_2 = K_e$.

$$\boxed{K_e = \frac{[O][P]}{[M][N]}}$$

This is mathematical form of law of mass action.

It can be used for partial pressure, mole fraction, etc.

In case of partial pressures:-

When the reactants and products are in form of gases, then we use their partial pressures:-

$$m.M(g) + nN(g) \rightleftharpoons oO(g) + pP(g)$$

Equation derivation:-

$$R_f = K_1 [M]^m [N]^n$$

$$K_r = K_2 [O]^o [P]^p$$

As we know

$$R_r = R_f$$

$$K_1 [M]^m [N]^n = K_2 [O]^o [P]^p$$

$$\frac{K_1}{K_2} = \frac{[O]^o [P]^p}{[M]^m [N]^n}$$

putting $\frac{K_1}{K_2} = K_e$

$$Ke = \frac{[O]^o [P]^p}{[M]^m [N]^n}$$

where o, p, m and n are respective concentrations raised to power times in balanced chemical equation.

APPLICATIONS OF LAW OF MASS ACTION:-

The law of mass action has following two applications:-

To determine =

1- The dissociation constant of weak electrolyte.

2- Solubility product of sparingly soluble solute.

Q No.7 (b) Write uses of common ion effect?

Answer:-

COMMON ION EFFECT:-

"When the same ion is introduced in the solution by different means (different types of compounds) then it precipitates out; this phenomenon is called common ion effect."

EXAMPLE:-

If in solution of sodium hydroxide (NaOH) we add sodium

carbonate (Na_2CO_3), then the solution will contain greater amount of sodium ions. This production of large sodium ions by introducing another solute or compound in the solution already containing sodium ions is called common ion effect.

It is the effect used in several chemical reactions.

USES OF COMMON ION EFFECT:-

Following are some of uses of common ion effect:-

1) For Separation of Ions:-

If we want to

separate certain ions from the solution, then we introduce solute containing ions of solution. Similar ions are precipitated out and separated.

2) For determination of Solubility:-
The solubility of salvent or solute can be determined by common ion effect.

3) For purification:-
In purification of certain compounds, common ion effect is being employed.
e.g: NaCl and HCl is used for purification Na by Cl^- as common ion.

4) In Laboratory Reactions:-

There are certain reactions in which we need that some reagents does not react. Such reactions are carried out by taking into considerance the phenomenon of common ion effect.

5) For preparation of concentrated solutions:-

Common ions are introduced in solutions which can be precipitated out. This accounts for preparation of several chemicals.

Q NO 2:- Give brief answer of the following questions :-

(a) Why ionization energies decreases down the group?

IONIZATION ENERGY:-

* The amount of energy released (minimum energy) when an electron is removed from the outer shell of atom in its isolated gaseous state is called ionization energy & ionization potential."

TREND IN GROUP:-

If we proceed down

The group I.E decreases as the atomic number increases.

REASON :-

The cause of decrease in ionization energy is that :-

Elections in heavy atoms are less tightly bounded to the nucleus. Their nuclear effect is lower than those atoms which have lower atomic number. So it causes lower value of ionization potential.

"Due to less effective nuclear charge on outer elections."

(b) Why positive charge ions are mostly smaller in size than neutral atoms.

Answer:- POSITIVE CHARGE IONS OR CATIONS:-

"When an atom or element loses one or more electron then it gets positive charge, and such species are called cations."

Cations are smaller than Neutral Atoms:-

Neutral atoms have electrons having equal shielding effect ~~on~~ the nuclear charge. If an electron is removed then nuclear effect is increased. It pulls the electron

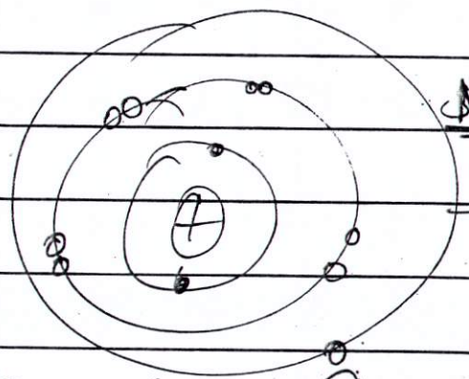
cloud more closer towards itself, causing it to reduce in size.

Example:-

Na = atomic # 9.

When it lose 1 e^- :-

Na^+ = atomic # 8.

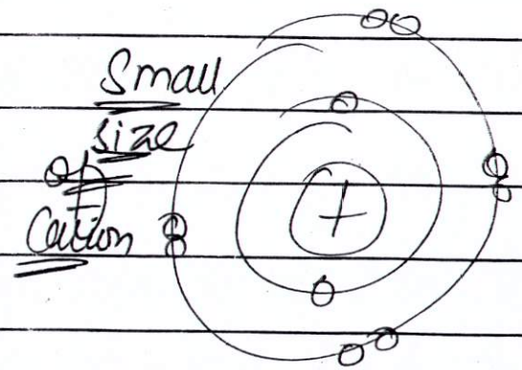


Neutral Atom

No of e^- = 9.

No of proton = 9

No of Neutron = 18.



Small size of Cation

No of e^- = 8

No of proton = 9

No of neutron = 18.

c) How does electro-ve difference decide nature of ionic bond?

Answer:- Electronegativity:-

The ability to attract shared pair of e⁻ is called as electronegativity.

Electronegativity difference:-

"The difference between the electronegativities of two atoms is called as electronegativity difference."

It decides the nature of bond as follows:-

If :-

1) E.N difference = 4

Then the resulting bond will be covalent bond.

2) E.N difference < 4 or < 1.

The resulting bond will be ionic in nature.

Thus in an ionic bond the two ions (cations & anions) are attracted towards each other due to the difference in their electronegativity.

Example:-

HF ----- HF

$H^{\delta+}$ --- $F^{\delta-}$ F = 4 en.

ionic bond. H = 1 en

E.N diff = 4-1 = 3.

d) Determine the period and group of oxygen with the help of electronic configuration.
(At. no of oxygen = 8).

Answer:-

Oxygen is present in the sixth "group (VIA)" of periodic table, and "second period".

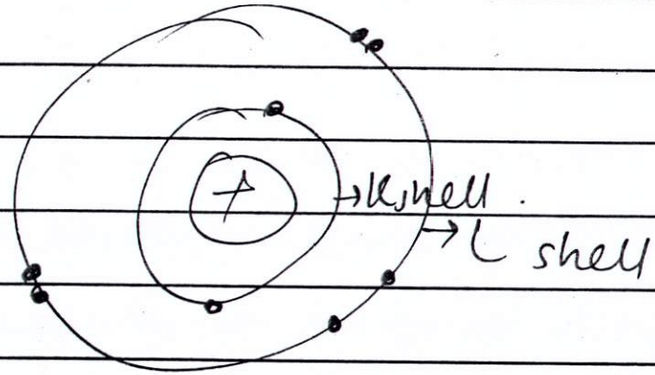
Its placement can be defined by following method using the electronic configuration:-

$_{8}^{16}O = 1s^2, 2s^2 2p^4$

→ p subshell indicates that it

is present in second period.

→ Six electrons in outer shell gave its presence in VIA group of periodic table.



Structure of oxygen atom.

e) What is reducing agent.

" The compounds or substances that are used to reduce other agents but itself are oxidized are called reducing agents. "

Example:

$K_2Cr_2O_7$, NH_3OH, MnO_4

Mn_2O_5.