9/10/2017 **CHEMISTRY P-II S.Y.B.Sc SEM-III MARKS 75 TIME 2.5HRS**

NOTE: i) All the questions are compulsory.

ii) Figures to right indicate full marks.

iii) Use of non –programmable calculator / log table is allowed.

Q.1. Attempt any four: **[20]**

a) Define hybridization? Explain sd hybridization.

b) Explain the structure of the PCl_5 on the basis of VBT.

c) Discuss the d^3s hybridization with suitable example.

d) Explain with the help of the MOT the magnetic nature of N_2 molecule.

e) Give the distribution of electrons in the molecular orbitals of B_2 diatomic molecule.

f) On the basis of MOT describe the structure of CO molecule.

g) For the formation of ionic compound explain the Born Haber cycle.

h) Calculate the lattice energy of NaCl crystals from the following data by the use of Born Haber cycle.

Heat of atomization of Sodium = 108.7.kJ mol^{-1}

Heat of atomization of chlorine = 120.9kJ mol^{-1}

Ionisation potential of Sodium = 493.7 kJ mol^{-1}

Electron affinity of chlorine = -365.3 kJ mol^{-1}

Heat of formation of NaCl = -410.9 kJ mol^{-1}

[20].

Q.2. Attempt any four:

a) Explain hydrogen bonding with suitable example.

b) Write down the applications of aromatic halogen compound.

c) What are the limitations of reagents used in preparations of haloarenes.

d) Write down the preparation of phenol from benzene sulphonic acid.

e) Explain atomic and ionic radii of transition elements.

f) Explain Preparation of arenes by Friedel craft's reaction.

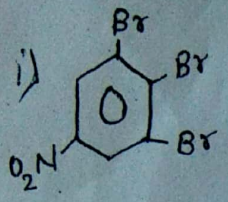
g) Write a note on melting point and boiling point of transition elements.

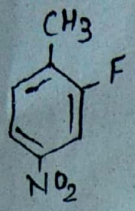
h) Write a note on metallic properties of transition elements. [20]

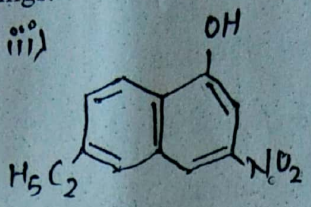
Q.3. Attempt any three:

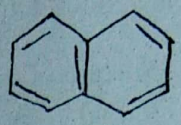
a) Draw the structures of isomers of trihydroxy benzene. Give their common and IUPAC names.

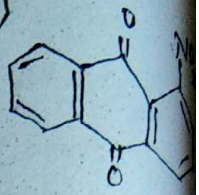
b) Give the IUPAC names of the followings.

i) 

ii) 

iii) 

iv) 

v) 

c) What is aromaticity? What are the conditions which must be satisfied for a compound to exhibit aromaticity? Give one example of aromatic compound.

d) Give an account of antiaromaticity with suitable examples.

e) Give a brief comparative account of aromaticity, antiaromaticity, homoaromaticity.

f) What are the advantages of using nitrating mixture? Give the mechanism of nitration of benzene.

g) What is Friedel craft's alkylation? Why anhydrous $AlCl_3$ is used? Give the mechanism of the reaction.

h) Explain the mechanism of alkaline hydrogen of p- chloro nitrobenzene. Why is it called addition-elimination mechanism?

Q.4. Attempt any three: **[15]**

a) Explain Ullmann reaction.

b) Write down atomic no. and electronic configuration of Sc and Zn.

c) Explain the ionic crystal, crystal lattice, lattice point, unit cell, lattice constants.

d) Explain the method of preparation, one chemical property, Structure and bonding in Borazine.

e) What is the function of $FeCl_3$ or $FeBr_3$ in halogenation of benzene? Give the mechanism of chlorination of benzene.

f) Explain the following:

1. Cyclobutadiene is an antiaromatic compound.
2. Homotropylium cation is homoaromatic in nature.