Registration no: | | | | | | | | | | |

Total Number of Pages: 02

M.Sc.I
FCYC101

1st Semester Regular / Back Examination– 2017-18
Inorganic Chemistry-I
BRANCH(S): M.Sc.I (AC)
Time: 3 Hour
Max marks: 70
Q Code:B919

Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) Write the various quantum numbers for the last electron of sodium.
b) Write the electronic configuration of $Cr[_{24}]$ and $Xe[_{54}]$.
c) Calculate the effective nuclear charge on the valence electron of Potassium.
d) What are the possible oxidation states of the elements of Boron family?
e) Two elements A and B have two and seven valence electrons respectively. What type of bond exists between A and B and what is the formula of the compound containing both?
f) Between NaF and CaF_2, which has higher lattice energy and why?
g) Frenkel defect is an example of _____ defect. (Stoichiometric / Non-stoichiometric)
h) Write the structure of S_8 and P_4.
i) Does He_2 exist? Explain by the help of molecular orbital theory.
j) What is the order of repulsion between the bond pairs and lone pairs of electrons?

Q2 **Give reason:** **(2.5x4)**

a) H_2S is a gas while H_2O is a liquid.
b) Dipole moment of NH_3 is more than NF_3.
c) NaCl is water soluble but AgCl is not.
d) Ionisation energy of nitrogen is more than oxygen.

Q3 What are quantum numbers? Write the different types of quantum numbers and their significance. **(10)**

Q4 a) What is screening effect? What are the factors affecting it? Write its variation in a period and group of the periodic table. **(2+4+1)**
b) Draw the shape of all the d-orbitals. **(3)**

Q5 a) Discuss the arrangement of Na^+ and Cl^- in the NaCl crystal structure. **(5)**
b) What is Fajans Rule? What are the factors affecting it? **(5)**

Q6 a) Draw the molecular diagram of oxygen. Predict the magnetic nature and the bond order of O_2^{++}, O_2^{+},O_2, O_2^{-}, O_2^{--}. **(6)**

b) Between o-nitrophenol and p-nitrophenol, which has more boiling point and why? **(4)**

Q7 **a)** Briefly discuss VSEPR theory. What are the structures of $SnCl_2$, CH_4, XeF_4, I_3^-, PCl_3 and ClF_3 on the basis of it? **(6)**

b) The bond length and experimental dipole moment of HCl is 1.27ºA and 1.03D respectively. Calculate the percentage of ionic character in HCl. **(4)**

Q8 **a)** On the basis of band theory, explain metals are good conductors of heat and electricity. **(5)**

b) Write notes on Born-Haber cycle. **(5)**