INTER B.SC. EXAMINATION, 2019

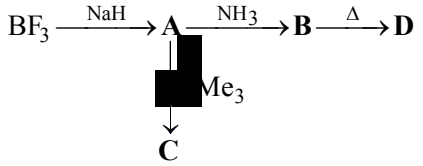
(2nd Semester, Old Syllabus)

CHEMISTRY (HONOURS)

INORGANIC CHEMISTRY

PAPER – X

Time : Two hours Full Marks : 50

1. a) 

Identify **A**, **B**, **C** and **D**. 2

b) Write a short note on (a) sodium peroxoborate and (b) Graphite Intercalation Compounds (GIC's). 3+3

c) Explain the structures of $[ClF_6]^-$ and $[IF_6]^-$. 2

d) Compare the oxidizing properties of

$[XO_4]^-$ [X = Cl, Br and I] in acidic medium. 3

2. a) Comment on the oxidation states of S atoms in tetrathionic acid and thiosulphuric acid. 2

b) Write down the synthesis, structure and reactivity of dithionic acid. 3

c) Write a short note on S_4N_4. 3

d) Describe the bonding that causes the P – O distance in OPR_3 (R = alkyl group) to be somewhat shorter than the usual single bond length. 2

e) Compare the structure of $(SiH_3)_2O$ and $(CH_3)_2O$. 2

3. a) Discuss the band theory of solids in details. 3

b) Explain the term : 'intrinsic and extrinsic semiconductor with proper examples.' 3

c) Why ZnO becomes yellow on heating ? 2

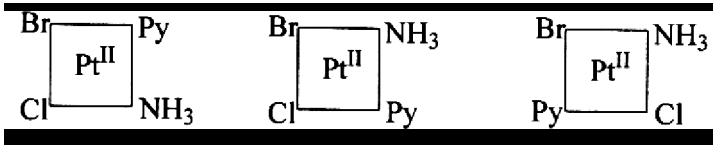
d) Would NiO be expected to show metallic properties ? 2

e) What is a solid solution and hence explain the term "interstitial solid solution" with example. 2

4. a) Find the stereoisomers of $[MA_2B_2C_2]$ with depiction of structure. 3

b) How did Alfred Werner establish the geometry of the hexa-coordinated complex ? 3

c) Prepare the following isomers starting from $[PtCl_4]^{2-}$. (Pt–N bond strength is greater than Pt–Cl bond strength ; the order of trans directing ability : $Br^- > Cl^- > Py > NH_3$)



3

d) Write the IUPAC nomenclature of the followings complexes (any two)

$[Co(NH_3)_6][CoCl_6]$, $[Fe(H_2O)_5NO]SO_4$, $[Ni(CN)_4]^{2-}$, $[Co(NH_3)_5(ONO)](BF_4)_2$ 2

e) Predict the geometry of diamagnetic $[Ni(CN)_4]^{2-}$ complex ion with the aid of Valence Bond Theory. 2