Roll No. : .....

Total No. of Questions : **11**] [Total No. of Printed Pages : **3**

BPP–1078

M.Sc. (Previous) Examination, 2022

CHEMISTRY

Paper - I (CH-401)

(Inorganic Chemistry)

*Time : **3** Hours*] [*Maximum Marks : **75***

Section–A **(Marks : 2 × 10 = 20)**

Note :– Answer all *ten* questions (Answer limit **50** words). Each question carries **2** marks.

Section–B **(Marks : 5 × 5 = 25)**

Note :– Answer all *five* questions. Each question has internal choice (Answer limit **200** words). Each question carries **5** marks.

Section–C **(Marks : 10 × 3 = 30)**

Note :– Answer any *three* questions out of five (Answer limit **500** words). Each question carries **10** marks.

Section–A

1. (i) Name and write down the rule which will be helpful in deciding the structure of five coordinated complexes with mixed ligands having different electronegativity.

(ii) What is stepwise constant ?

(iii) With the help of a diagram show the $d\pi$-$p\pi$ bond in a molecule.

(iv) Define Trans-effect.

(v) What is a three centre two electron bond ? Explain with example.

(vi) Write down various types of symmetry elements.

(vii) Ground state term symbol for Mn^{+2} ion is ..... .

(viii) Calculate the spin only magnetic moment of the following ions :

(a) $[MnCl_6]^{3-}$

(b) $[Fe(CN)_6]^{3-}$

(ix) Write down *two* examples of each :

(a) Dinitrogen complexes

(b) Tertiary phosphine as ligand

(x) Write down *two* reactions of preparation of metal carbonyl.

Section–B

2. Draw Walsh diagram for a penta atomic molecule.

Or

Explain Chelate effect and its thermodynamic origin.

3. What do you mean by inert and labile complexes ? Explain with examples.

Or

Write a note on conjugate base mechanism.

4. Give difference between CFT and MOT.

Or

Explain relation between orders of a finite group and subgroup.

5. How *d-d* transition and charge transfer are responsible for colour in complexes ?

Or

What do you mean by magnetic exchange coupling ? Explain.

6. Write down important reactions of metal nitrosyls.

Or

Write a note on application of green chemistry in synthesis.

Section–C

7. Define formation constant. Explain spectrophotometric method for determination of binary formation constant.

8. Write notes on the following :

   (a) Acid hydrolysis

   (b) Base hydrolysis

9. Explain structure and bonding in $C_2B_{10}H_{12}$.

10. Draw and explain Tanabe-Sugano diagram for transition metal complexes. (d^1—d^9 states).

11. Write a note on use of vibration spectra of metal carbonyls for bonding and structural elucidation.