

U.G. 4th Semester Examination - 2020

CHEMISTRY

[HONOURS]

Course Code : CEMH-CC-T-9

Full Marks : 40

Time : 2½ Hours

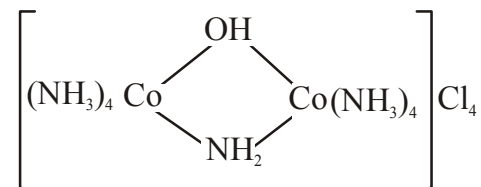
The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **two** questions: 1×2=2
 - a) What is ambidentate ligand?
 - b) Draw the structure of peroxo-disulphuric acid.
 - c) Define packing fraction.

2. Answer any **four** questions: 2×4=8
 - a) Why boron nitride is called inorganic graphite.
 - b) 1gm radium 226 is placed in a sealed tube. How much helium will be evolved in 60 days? ($t_{\frac{1}{2}}=1590$ years).
 - c) Boron has oxidation state +3 whereas Tl has H though both belongs to same group-Explain.

- d) Give the mathematical expression of the 'Radioactive Decay law'. and give the physical significance of decay constant.
- e) Give the reasons for extra stability of chelates.
- f) Write IUPAC name of the following:



3. Answer any **two** questions: 5×2=10
 - a) i) Predict the possible isomers of $\text{Co}(\text{en})_2\text{Cl}_2$. (en=ethelene diamine)
 - ii) Arrange the following in increasing order of acidity: H_3PO_4 , H_3PO_3 , H_3PO_2 . 3+2
 - b) i) Give a comparative account of the nuclear binding energy curve and packing fraction curve. What information are available from these curves?
 - ii) Explain why borazine is more reactive than benzene. 3+2
 - c) i) Establish the relation between overall and stepwise stability constant for the complex ML_6 .

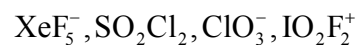
- ii) "Freons deplete the ozone layer of upper atmosphere"—Explain with equation.

3+2

4. Answer any **two** questions: $10 \times 2 = 20$

- a) i) Describe with suitable diagrams how SiO_4^{2-} tetrahedral units are linked together to form different types of chain silicates.

- ii) Predict the shapes and indicate the state of hybridisation of the central atom for the following:



- iii) Discuss the structure and bonding of B_2H_6 .

2+4+4

- b) i) Write short note on:

A) Radio carbon dating

B) Phosphazene

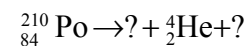
- ii) How are the fluoride of xenon prepared?

- iii) Arrange the oxyacids of chloride in the increasing order of their acid strength in aqueous solution. Give explanation for your arrangement. $(2\frac{1}{2} + 2\frac{1}{2}) + 2\frac{1}{2} + 2\frac{1}{2}$

- c) i) Give an example each of hydrate, ionisation and linkage isomerism. Discuss in brief, how would you differentiate between the isomers.

- ii) Discuss on the mass and energy distribution in fission fragments of nuclear reactions.

- iii) Complete the following transformation:



- iv) Give an example of an inner-metallic complex with cobalt(III).

- v) Discuss the preparation and structure of perdisulphuric acid. $4+2+1+1+2$
