

93  
24  
Roll No. 2031

Exam Code : M-23

Subject Code—59360

**B.Sc. EXAMINATION**

(Main/Reappear)

(Batch 2018 Onwards)

(Sixth Semester)

**CHEMISTRY**

CCL-603(i)

Organometallics and Bio-inorganic Chemistry,  
Course-III

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Q. No. 1 is compulsory. Attempt *one* question  
each from Units I-IV.

1. (i) Which shows lowest oxidation number  
Cr, Mn, Co, Cu ? 2

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P.T.O.

(ii) Chromyl chloride test is used for detection of which radical ? 2

(iii) Is  $\text{Ti(OR)}_4$  an organometallic compound ? 2

(iv) What are bridging ligand ? Draw one example. 2

(v) What is the oxidation number of Fe in  $\text{Na}_4(\text{Fe(CN)}_5\text{NOS})$  ? 2

(vi) Give two examples of  $\text{Fe(0)}$  compounds. 2

(vii) Why  $\text{Cu}^{2+}$  forms more stable complexes than  $\text{Cu}^+$  ? 2

(viii) Give example of 3 electron donor ligand. 2

#### Unit I

2. (a) How is  $\text{K}_2\text{Cr}_2\text{O}_7$  prepared ? Explain its oxidizing property. 10

(b) Discuss the structure of  $\text{Cr}_2\text{O}_7^{2-}$  and  $\text{CrO}_4^{2-}$  ions. 6

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3. (a) Explain the structure, preparation and uses of potassium ferrocyanide. 10

(b) Discuss various oxidation states of iron. 6

#### Unit II

4. (a) Discuss the different types of organometallic compounds with examples. 8

(b) What do you understand by  $\beta$ -elimination in transition metal alkyls ? How can it be avoided ? Explain giving example. 4

(c) Discuss the structure of Methyl Lithium. 4

5. (a) What are organometallic compounds ? Give IUPAC names of the following : 4

(i)  $\text{Ni}(\pi\text{-C}_5\text{H}_5)_2$

(ii)  $\text{Ru(CO)}_3(\text{C}_4\text{H}_6)$

(iii)  $\text{Co(CO)}_3(\pi\text{-C}_3\text{H}_5)$

(iv)  $[\text{PtCl}_3(\text{C}_2\text{H}_4)]^-$

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P.T.O.

- (b) Discuss synthesis, structure and bonding of Zeise's salt. 12

### Unit III

6. (a) Explain synergic effect. How IR frequencies of metal carbonyls gets affected due to synergic effect? 6
- (b) Explain the bonding in Ferrocene and  $\text{Ni(CO)}_4$ . 10
7. Discuss the following with suitable example
- (a) Mononuclear Metal Carbonyls 5
- (b) Binuclear Metal Carbonyls 5
- (c) Polynuclear Metal Carbonyls. 6

### Unit IV

8. (a) Discuss the role of alkali and alkaline earth metal ions in biological systems 10
- (b) Discuss the reasons as to why  $\text{Fe(II)}$  in Mb does not oxidise. 6

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9. (a) Draw the structure of heme. Discuss the nature of  $\text{Heme-O}_2$  binding in Hb. 8
- (b) Write a short note on  $\text{Na}^+\text{-K}^+$  pump. 8

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