

Roll No. 213112350022

Exam Code : M-24

Subject Code—61436

B.Sc. EXAMINATION

(Main/Re-appear) (Batch 2019 Onwards)

(Sixth Semester)

CCL-603 (i)

CHEMISTRY

Course-III

Organometallics and Bio Organic Chemistry

Time : 3 Hours

Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) Why Cu^{2+} forms more stable complexes than Cu^+ ? 2
- (b) What is Chromyl chloride test ? 2

(8-02-22-0524) J-61436

P.T.O.

- (c) What is Hapticity ? Give one example of it. 2
- (d) Give the structure of ferrocene. Also write its IUPAC name. 2
- (e) Why CO acts as π -acceptor Ligand ? 2
- (f) $R-T_1(OR)_3$ is an organometallic compound. Justify. 2
- (g) What do you understand by Bioinorganic compound ? 2
- (h) Which metal is present in chlorophyll ? 2

Unit I

2. (a) What are the important oxidation states of Iron (Fe) ? Discuss the chemistry of +2 and +3 oxidation states of Iron. 8
- (b) Draw and discuss structure of $[Cr(CH_3COO)_2 H_2O]_2$. 6
- (c) Draw structure of CrO_5 and MnO_4 . 2

J-61436

2

3. (a) How is $K_2Cr_2O_7$ prepared ? What happens when Acidified $K_2Cr_2O_7$ reacts with : 8
- (i) $FeSO_4$ (ii) KI (iii) SO_3^{2-} .
- (b) Give preparation of sodium nitroprusside. Also explain its structures and magnetic properties. 6
- (c) Give two oxidising properties of acidified $KMnO_4$ with examples. 2

Unit II

4. (a) Discuss different types of organometallic compounds with examples. 12
- (b) Which of the following do and which do not obey EAN rule ? 4
- (i) $Mn(CO)_5Cl$
- (ii) $Cr(CO)_6$
- (iii) $CO_2(CO)_6$ ($RC \equiv CR$)
- (iv) $[Mn(CO)_5]^-$.

(8-02-23-0524) J-61436

3

P.T.O.

5. (a) Draw and discuss structures of the following :
- (i) FERROCENE
 - (ii) Methyl Lithium. 8
- (b) What is meant by Hapticity of a ligand ? How is it designated ? Classify ligands on the basis of Hapticity. 8

Unit III

6. (a) Discuss the structure of the following metal carbonyls : 12
- (i) Mono nuclear
 - (ii) Dinuclear
 - (iii) Trinuclear carbonyl.
- (b) Give two methods for the preparation of metal carbonyls. 4
7. (a) How do infrared spectroscopy help in explaining the type of metal-CO group bonding in the complex. 12
- (b) Draw molecular orbital level diagram for CO molecule. 4

Unit IV

8. (a) Discuss the roles of Na^+ and K^+ ions in Biological system. 10
- (b) Explain sodium pump is Electrogenic in nature. 6
9. (a) Discuss the biological importance of Ca^{2+} . How is it different from that of Mg^{2+} ? 8
- (b) Discuss different types of bonds responsible for stabilization of protein structures. 8