

APRIL/MAY 2019

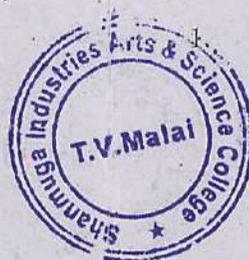
MCH42 — INORGANIC CHEMISTRY — IV

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.



- (a) Identify the isomers of $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ and explain as to how IR spectroscopy can be used to identify them.

Or

- (b) Distinguish the Stokes and anti-Stokes line in Raman Spectrum.

2. (a) How is NMR useful in the study of fluxional behaviour?

Or

- (b) Explain isomer shift in Mossbauer spectroscopy.

3. (a) Discuss the ESR spectrum of copper complexes.

Or

- (b) Explain as to how many NIS signals are expected for $\text{Co}(\text{en})_2(\text{NO}_2)_2\text{NO}_3$.

4. (a) Discuss the applications of AES.

Or

(b) Explain the principles involved in AAS.

5. (a) Discuss the working of a Faraday balance.

Or

(b) Calculate the spin only magnetic moment of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$. What is the standard used in the Gouy balance?

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) For $[\text{Co}(\text{CO})\text{NO}(\text{P}Cl_x\text{pph}_{3-x})_2]$, the CO stretching frequency decreases as the number of x increases – Explain.

(b) Give comparative account of the UV-visible spectra of octahedral and tetrahedral complexes. (8+7)

7. (a) Write a note on the principle and applications of ^{31}P NMR spectroscopy.

(b) Discuss the Mossbauer spectrum of $[\text{Fe}(\text{Fe}(\text{CN})_6)]$ in detail. (10+5)

8. Discuss the XPES of the following species.

(a) $\text{Na}_2\text{S}_2\text{O}_3$

(b) N_3^-

(c) O_2

(d) $[(\text{NH}_3)_5\text{RU}(\text{Ryrazine})\text{RU}(\text{NH}_3)_5]^{5+}$
(4+4+3+4)

9. (a) Explain the principles and applications of HPLC.

(b) The Technique of atomic absorption is limited to methyl radical. Explain. (10+5)

(a) Discuss the application of amperometry in detail.

(b) Distinguish Ferromagnetism and antiferromagnetism. (10+5)

