

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

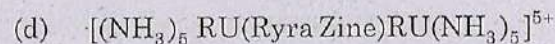
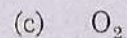
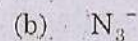
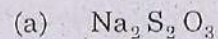
- (b) Calculate the spin only magnetic moment of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$. What is the standard used in the Gouy balance?

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) For $[\text{Co}(\text{CO})\text{NO}(\text{P}(\text{Cl}_x\text{Ph}_{3-x})_2)_2]$, 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.



(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)

