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WT—45—2024

FACULTY OF SCIENCE

M.Sc. (First Year) (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(New/CBCS Pattern)

CHEMISTRY

Paper II (CH-421)

(Inorganic Chemistry)

(Wednesday, 11-12-2024)

Time : 10.00 a.m. to 1.00 p.m.

Time—Three Hours

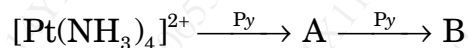
Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) Log table and calculator is allowed.

1. Answer the following (any *three*) : 15

(a) Predict the products 'A' and 'B' in the following reaction :



(b) Define catalyst and role of catalyst in Wacker oxidation of alkenes.

(c) Give the biological importance of non-essential elements.

(d) Calculate the number of fundamental modes of vibration of CO₂ and SO₂.

(e) Explain basic principle of ESR spectroscopy.

P.T.O.

2. Answer the following (any *three*) : 15

- (a) Give the evidence for associative type S_N^2 mechanism.
- (b) Explain the language of catalysis with reference to catalytic cycle.
- (c) What are metalloporphyrin ? Explain it with suitable examples.
- (d) "The compound $Na_4[Fe(CN)_6]$ gives single line Mossbauer spectrum with no quadrupole splitting". Explain.
- (e) Give the applications of vibrational spectroscopy with respect to change in spectra of donor molecule upon complexation.

3. (a) Explain π -bonding theory of trans effect. 8

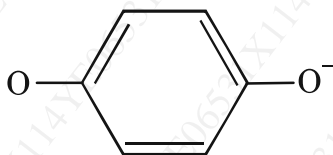
Or

Role of catalyst in methanol carbonylation.

(b) Describe structure and functions of cytochrome. 7

Or

Explain the following points of semibenzoquinone radical :



- (i) Number of lines
- (ii) Spectrum
- (iii) Hyperfine structure
- (iv) Relative intensities.

4. (a) Explain the application of thiourea for distinguishing cis and trans isomer of formula $[\text{PtCl}_2(\text{NH}_3)_2]$. 8

Or

Explain role of palladium catalysed 'C-C' bond forming reaction.

- (b) Describe structure and functions of Haemoglobin. 7

Or

$\text{K}_4[\text{Fe}(\text{CN})_6]$ show single line Mossbauer spectra. Explain.

5. Write notes on (any *three*) : 15

- (a) Cis-effect
- (b) Rubredoxin and Ferredoxin
- (c) Fischer-Tropsch synthesis
- (d) Reference Compound in ESR.