This question paper contains **2** printed pages]

NEPWT—32—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

CHEMISTRY

Paper SCHEC-451

(Inorganic Chemistry)

(Wednesday, 11-12-2024) **Time : 10.00 a.m. to 1.00 p.m.**

Time—Three Hours *Maximum Marks*—80

Note :— (*i*) Question No. **1** is compulsory and solve any *three* from remaining five questions.

(*ii*) Calculator and log table is allowed.

1. (*a*) Explain importance of essential elements. 5

(*b*) Explain role of catalyst in alkene hydrogenation reaction. 5

(*c*) Explain isolobal fragmentation of transition elements. 5

(*d*) Calculate EPR line predicted for $\dot{C}F_2H$ radical : 5

(12_C, I = 0, F, H = I = 1/2)

P.T.O.

2. (*a*) What is catalyst ? Explain the role of catalyst in alkene polymerisation. 10

(*b*) Calculate the force constant for Ni–N bond in nickel dimethyl glyoxime complex. IR spectrum of dimethyl glyoxime does not show band in the region of 500 to 600 cm^{-1} but $Ni(CMG)_2$ shows medium intensity band at 550 cm^{-1}. (Atommic weight of Ni = 58.71, N = 14, No = 6.022×10^{23}) 10

3. (*a*) Explain Mossbauer spectrum of $K_3[Fe(CN)_6]$. 10

(*b*) What is isolobal analogy ? What are the Hofmann conditions for isolability. Explain isolability, between $Fe(CO)_4$ and $Cr(CO)_5$. 10

4 (*a*) Explain Waker's oxidation of alkene in detail. 10

(*b*) Describe the structure and functions of myoglobin. 10

5 (*a*) Explain number of lines, spectrums, hyperfine splitting and relative intensities of $\dot{C}H_3$ radicals. 10

(*b*) Give importance of Na^+/K^+ pump in biological system. 10

6. (*a*) Write a short note on Bohr's effect. 5

(*b*) Write a short note on Fischer Tropsch synthesis. 5

(*c*) Write a short note on isolobal analogy. 5

(*d*) Reference compound in ESR. 5