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NEPRT—06—2024

FACULTY OF SCIENCE

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

APRIL/MAY, 2024

CHEMISTRY

SCHEC–401

(Inorganic Chemistry–I)

(Friday, 19-4-2024) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—80

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

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

1. (*a*) Explain outer sphere electron transfer mechanism with suitable example. 5

(*b*) How will you prepare cis and trans $[Pt(PPh_3)(NH_3)Cl_2]$ square planar complexes ? 5

(*c*) Briefly explain the terminology and history of nanoscience. 5

(*d*) Explain metal to ligand charge transfer spectra. 5

2. (*a*) What is SN^1 and SN^2 ligand substitution mechanism ? Explain the types of intermediates formed in SN^1 and SN^2 mechanism. 10

P.T.O.

(*b*) Describe about solution based synthesis of Gold nanoparticles and quantum dots. 10

3. (*a*) Define carbon nanotubes. Describe their classes in detail. 10

(*b*) Calculate the number of microstates for P^3 configuration and ^2D term. 10

4. (*a*) What is trans effect ? Explain π-bonding theory of trans effect. 10

(*b*) Draw and explain Orgel diagram for d^2 and d^8 configuration in octahedral complexes. 10

5. (*a*) Write the preparation of nanomaterials by Sol-Gel process. 10

(*b*) Determine the spectroscopic ground state term symbol for d^4 and d^7 configuration. 10

6. (*a*) Give the evidences for SN^1CB mechanism in octahedral complexes. 5

(*b*) Write a note on cis effect. 5

(*c*) Write a note on artificial nanomaterials. 5

(*d*) What is spin crossover ? Explain it with suitable example. 5