N.B.: 1. Questions no. 1 is compulsory.

2. Attempt any three questions from remaining five questions

3. Figures to the right indicate full marks.

Q1. Attempt any four questions of the following: **[20]**

a. Write note on Transport number. Explain w.r.t Moving boundary method.

b. What is EAN? Calculate EAN for

(i) $[Fe(H_2O)_6]^{2+}$ (ii) $[Co(NH_3)_6]Cl_3$

c. Explain Michael addition reaction with mechanism.

d. Give synthesis of Alizarin. Give two applications.

e. Discuss relative energies of n-Butane in Eclipsed, Gauche & Anti conformation with the help of Newman projection.

f. Lanthanum is extracted from its aqueous solution as its hydroxyl quinolate by chloroform. A 100 cm^3 of aqueous solution containing 0.04 moles are extracted with 20 cm^3 of chloroform when distribution ratio is 370. Calculate (i) amount of lanthanum not extracted (ii) The percentage extraction.

Q2.

a. Define following terms. [5]

(i) Equivalent conductance. (ii) Specific Conductance.

b. Give preparation of $Fe(CO)_5$ molecule. Express their bonding and hybridization. [5]

c. What are qualities of ideal fertilizers. [5]

d. What are complexing agents in solvent extractions? Explain in brief. [5]

Q3.

a. Explain Oxygen transportation in haemoglobin. [5]

b. Predict the product with mechanism. If 2,3-Dimethyl butane-2,3-Diol is treated in presence of acid. [5]

c. Give chemical composition of super phosphate & triple super phosphate. Give two uses of phosphate fertilizers. [5]

d. Explain the separation of lanthanides by ion exchange method. [5]

Q4.

a. Calculate CFSE for d^4 and d^6 system in the strong filed and weak filed of octahedral complexes.

b. Explain the Concept of Chirality with suitable examples. [5]

c. Define Carbocation. Comment on its structure and stability. [5]

d. What are the different type of fertilizers? Give two uses of fertilizers**.** [5]

Q5

a. Explain facial and meridional isomers in the octahedral coordination compounds. [5]

b. Write a note on Carbonic anhydrase. Give any two functions. [5]

c. Explain sulphonation of naphthalene. Discuss thermodynamically and kinetically stable product.

d. What are basic methods used in liquid-liquid extraction? Describe batch extraction process in detail. [5]

Q6.

a. Explain conductometric titration between Strong Acid Vs Strong Base. Discuss advantages & Limitations. [5]

b. Define Carbene. Comment on its structure and stability. [5]

c. Give Synthesis of Congo red dye. Give two applications. [5]

d. Give nomenclature of following. [5]

(i) $Na_2[Zn(OH)_4]$ (ii) $K_4[Fe(CN)_6]$
