Important Questions - Topic wise
from Unit-2 & 3.

Unit-2 & (UV-Visible spectroscopy).

1. Beer-Lambert's law with Numericals.
2. Electronic Transitions in UV visible with examples.
3. Auxochrome, Chromophores with examples.
4. Absorption & Intensity shifts with examples & diagram (Bathochromic, Hypsochromic, Hyperchromic, Hypochromic)
5. ~~λ~~ λmax in conjugated systems.
6. Applications, and Selection Rule of UV visible.

(IR-spectroscopy)

1. Selection Rule (IR Active / Inactive molecules)
2. Fundamental Modes of vibrations in IR (Stretching/Bending etc.) in AX_2 + hypothetical
3. Calculation of fundamental modes (in linear & non-linear molecules) (3N-5 or 3N-6) with examples.
4. Calculation of frequency (ν) from Force constant.
5. Applications & Numericals on IR (done in class).
6. Various regions of IR spectrum (functional gp region, finger print region, low frequency region).

(NMR spectroscopy)

1. NMR active & Inactive atoms. ($I > 0$) Examples.
2. Principle/Theory
3. Shielding, Deshielding, chemical shift
4. TMS as a reference. Why?
5. Equivalent & Non-equivalent protons. No. of signals, splitting of signals (spin-spin coupling).
6. Numericals on ~~unknown molecules for~~ the identification of ~~a~~ molecular structure by studying δ values (given).
7. What are δ scale & τ scale?

Stereochemistry

1. explaination of chiral drugs (with all the examples done in class)
2. Atropisomerism (optical activity without chiral carbon) with 5-6 examples.
3. E/Z system of nomenclature → explaination, sequence rules with example and assign E/Z to different molecules.

Important Questions

Unit-3

Electrochemistry

1. Galvanic cell - construction & working (Reactions, cell representation diagram etc. included)
2. Nernst Equation derivation
3. Numericals on Nernst Equation.
4. Numericals on Temperature co-efficient ($\Delta G, \Delta S$ & ΔH calculation)
5. Applications of Electrochemical series (Investigation of oxidizing & reducing power, feasibility of reaction etc.)
6. Primary & secondary batteries description, difference, Diagram, chemical reactions etc. [Pb-storage battery with charging & discharging reactions].

Corrosion

1. Wet / Electrochemical theory of corrosion. [H_2 Evolution & O_2 absorption mech.]
2. Factors affecting corrosion.
3. Corrosion prevention by
   (i) Proper designing
   (ii) Inhibitors — Cathodic, Anodic, vapour phase.
   (iii) Metallic coatings — Cathodic, Anodic coatings
   (iv) Cathodic protection methods — Sacrificial Cathodic Protection; Impressed current Cathodic protection

   with diagrams & reactions (wherever given.)
4. Numerical on Rust Fe_2O_3 .... (done in class)
5. Types of corrosion (water line, pitting, concentration cell corrosion (differential aeration corrosion, crevice corrosion)

Cement.

1. Portland cement in detail -
   composition,
   Manufacturing (with formulae, reactions, diagrams)
   Setting & harding reactions
   Role of gypsum, decay ...
2. Plaster of paris → preparation, properties, applications.