SYLLABUS FOR GSAT-2017
FOR ADMISSION TO M.Sc. Chemistry (Analytical/Organic/Pharmaceutical)
(TEST CODE NO: 103)

SECTION-A **(15 Bits :15 Marks)**

1. s-block & p-block elements:

General characteristics of groups I & II elements, diagonal relationship between Li & Mg, Be & Al. General characteristics of elements of groups 13, 14, 15, and 17. Inter halogen compounds and pseudo halogens

2. Chemistry of d-block elements:

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states and e.m.f. Comparative treatment of second and third transition series with their 3d analogues. Study of Ti, Cr and Cu traids in respect of electronic configuration and reactivity of different oxidation states.

3. Coordination Chemistry:

Bonding theories – review of Werner's theory, Valence bond theory, Crystal field theory.

SECTION-B **(20 bits : 20 Marks)**

4. Structural theory in Organic Chemistry:

Types of bond fission and organic reagents (Electrophiloic, Nucleophilic), Bond polarization, Electro negativity – Inductive effect.

5. Carbonyl compounds:

Synthesis of aldehydes and ketones. Reactivity, Nucleophilic addition, Base catalysed reactions:

a) Aldol, b) Cannizzaro reaction, c) Perkin reaction, d) Benzoin condensation; Oxidation of aldehydes, Reduction: Clemmensen reduction, Wolf-Kishner reduction, reduction with $LiAlH_4$ and $NaBH_4$.

6. Nitrogen compounds:

Preparation of Nitroalkanes. Reactivity – halogenation, reaction with HONO, Amines (Aliphatic and Aromatic): Classification into 1^0, 2^0, 3^0 Amines and Quarternary ammonium compounds.

SECTION-C **(25 bits : 25 Marks)**

7. Electrochemistry:

Conductance, Kohlrausch's law. Ostwald's dilution law. Debye-Huckel-Onsagar's equation for strong electrolytes. Transport number.

Electrode reactions, Nernst equation, Single electrode potential, Reference electrodes, Electrochemical series and its applications.

8. Chemical kinetics:

Rate of reaction, Order and Molecularity, Derivation of rate constants, Effect of temperature, Theories of reaction rate, collision theory.

9. Atomic Structure:

Blackbody radiation, Planck's radiation law, photoelectric effect, Compton Effect, de Broglie's hypothesis, Heisenberg's uncertainty principle.

10. Chemical Bonding:

Valence bond theory, hybridization, Dipole moment , Molecular orbital theory.

MODEL QUESTIONS

1. The wavelength associated with an electron moving with a velocity of 10^8 cm per sec will be
   (a) 8.20 A^0 (b) 7.27 A^0 (c) 5.50 A^0 (d) 6.50 A^0
   Ans: (b)
2. which one of the following is not paramagnetic?
   (a) B_2 (b) O_2 (c) NO (d) O_2^{2-}
   Ans: (d)
3. The bond order in O^{2+} ion is
   (a) 2 (b) 2.5 (c) 1.5 (d) 3
   Ans: (c)