SYLLABUS FOR GSAT-2012 ENTRANCE TEST
for admission into
M.Sc. ANALYTICAL/ORGANIC CHEMISTRY
(Test Code No: 103)

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

1. **Chemistry of d-block elements:**
   Characteristics of d-block elements.

2. **Coordination Chemistry:**
   Bonding theories – review of Werner's theory, Valence bond theory, Crystal field theory.

3. **Metal complexes:**
   Labile and inert complexes, Ligand substitution reactions – S_N1 and S_N2, Substitution reactions of square planar complexes.

SECTION-B **(20bits: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 **(25bits: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)