INDIAN INSTITUTE OF INFORMATION TECHNOLOGY, UNA [HP]
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GUEST FACULTY (ON CONTRACT BASIS) RECRUITMENT – OCTOBER 2019

SYLLABUS FOR WALK IN WRITTEN TEST ON 05, Oct.'19

CHEMISTRY

ORGANIC CHEMISTRY

Reaction mechanism: Definition of reaction mechanism, transition state theory, kinetics, qualitative picture. Nucleophilic substitution: SN1, SN2, SNi. Aromaticnucleophilic substitution, SNAr, benzyne, SN1. Addition to carbon-carbon multiple bonds: Electrophilic, nucleophilic and free radical addition. Hydrogenation, halogenation, hydroxylation, hydroboration.

Elimination reactions: E1, E2, E1CB- mechanism, Oxidation and reduction: Theories of aromaticityAromatic electrophilic substitution:

Fundamentals of photochemistry, Pericyclic reactions, electrocyclic, sigmatropic, cycloaddition and ene reactions, Woodward-Hoffmann rules, and FMO theory, Optical activity and chirality: absolute and relative configuration - R-S notation system, E, Z- nomenclature of olefins, Conformational analysis.

Rearrangement reactions: involving electron deficient, carbon, nitrogen, oxygen centers, Reagents in organic synthesis: and important name reactions

INORGANIC CHEMISTRY

Theories of coordination compounds - VB theory - CFT - splitting of d orbitals in ligand fields and different symmetries - CFSE -factors affecting the magnitude of 10 Dq
Structure: Structure of coordination compounds with reference to the existence of various coordination numbers (2, 3, 4, 5 & 6) –site, coordination number seven and eight. 18/16-electron rule,metallocenes

Reaction mechanism and catalysis: Wilkinson's catalyst -hydroformylation of olefins - WackerSmidt synthesis - Monsanto acetic acid process -Eastman Halcon process - Fischer-Tropschprocess - hydrosilylation.

Types of solids - close packing of atoms and ions - bcc, fcc and hep voids - Band theory of solids. Schottky and Frenkeldefects Energy bands, insulators,semiconductors and conductors metals.

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PHYSICAL CHEMISTRY

Thermodynamics: Laws of thermodynamics, chemical potential, Gibbs Duhem equation and its applications Phase rule, colloids and micelles: one and two component systems, eutectic systems colloids: Distinction between suspension, colloidal solutions and true solutions, lyophilc and lyophobic colloids, Tyndall effect, stabilityof colloids, coagulation, emulsions, various types.

Electrochemistry: Nernst equation-Some electrochemical reactions of technological interest - corrosion and passivity of metals - construction and use of Pourbaixand Evans diagrams - methods of protection of metals from corrosion,

Chemical kinetics- theories ofreaction rates - transition state theory and collision theory a comparison - enthalpy, entropy and free energy of activation, Enzyme catalysis - rates of enzyme catalysed reactions - determination of Michael's parameters.

Surface chemistry: types of adsorption isotherms, physisorption and chemisorption, Freundlich, derivation of Langmuir and BET isotherms, surfacearea determination.and mechanism of heterogeneous catalysis, phase transfer catalysis.

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