Third Year Sixth Semester

Paper602101 Physical Chemistry 3Credits,75 Marks(45hrs)

3 Hrs/ week

I) Colligative properties of Dilute Solutions 13 hrs

Dilute solution, colligative properties, Raoult's law, relative lowering of vapour pressure. Elevation in boiling point of a solution, thermodynamic derivation relating elevationin the boiling point of a solution and the molar mass of a non volatile solute.Depression in freezing point of a solution, thermodynamic derivation relating the depression in the freezing point a solution and the molar mass of a non volatile solute.Osmotic pressure, van'thoff's equation for osmotic pressure (derivation is expected) and determination of molar mass of the solute abnormal molar masses of solutes and van't Hoff factor (calculation of degree of association and degree of dissociation)

II) Nuclear Chemistry 10 hrs

Type of nuclear radiations and their characteristics, behaviour of ion-pairs electric field, detection and measurement of nuclear radiations using G.M. counter and scintillation counter.Kinetics of radioactive decay, units of radioactivity (Curie, becquree, Rutherford).Radioactive equilibrium (secular and transient) determination of radioactive consents for radio-elements having 1) moderate half life, 2) long life, 3) extremely long or short half life.Use of radioisotopes as tracers in, 1) chemical investigations reaction mechanism, 2) age determination – dating by tritium content and by carbon -14.

Nuclear Reaction – nuclear transmutation, artificial radioactivity (suitable examples using different projectiles are expected) Q-value of nuclear reactions, threshold energy. Fissile and fertile material, nuclear fission, chain, reaction, factors controlling fission process(multiplication factor and critical size or mass of fissionable material) nuclear reactor and breeder reactor. Nuclear fusion, characteristics of nuclear fusion, thermonuclear occurring ins stellar bodies.

III) Renewable Energy Sources 07 hrs

Batteries – Secondary cells lithium ion cell.

Fuel Cells – Choice of fuel and oxidant, thermodynamic and kinetic aspect of electrochemical energy transformation, efficiency of fuel, cells, bacon'H2 and O2 fuel cell.

Solar cells, solar energy, photovoltaic effect, semiconductor, as solar energy converters, silicon solar cell.

Biomass energy : biomass and its sources, conversion on biomass into energy by alcohol fermentation and anaerobic digestion method.

Hydrogen : Fuel of the future, production of hydrogen by direct electrolysis of water and biomass gasification, advantage of hydrogen energy medium.

IV) Surface chemistry 15 hrs

Adsorption, physical and chemical adsorption, types of adsorption isotherms, Langumir's adsorption isotherm, (Postulates and derivation expected) B.E.T. equation for multilayer adsorption equation is expected) determination of surface area of and adsorbent using B.E.T. equation.