LESSON PLAN OF PHYSICAL CHEMISTRY FOR B.Sc. 2nd SEMESTER SESSION 2021-2022

NAME OF LECTURE:-DR.PARVESH GUPTA

SUBJECT: - PHYSICAL CHEMISTRY

SR.NO.	MONTH	TOPIC
1	April 1st week	Chemical Kinetic :-Introduction Rate of chemical reaction, rate equation and its types.
2		factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst
3	April 2nd week	Order of a reaction, integrated r ate expression for zero order, first order
4		second and third order reactions. Half life period of a reaction.
5	April 3rd week	Effect of temperature on the rate of reaction – Arrhenius equation
6		Theories of reaction rate – Simple collision theory for unimolecular collision
7	April 4th week	Transition State theory of bimolecular reactions.
8		NUMERICAL PROBLEM ON THE BASIS OF FISRT AND SECOND ORDER REACTION.
9	MAY 1st week	NUMERICAL PROBLEM ON THE BASIS OF THIRD ORDER REACTION AND HALF LIFE PERIOD OF REACTION.
10		Imp. Characteristics of second and third order reaction.
11	MAY 2nd week	Rate of Radioactive disintegration on decay, Average life and Radioactive Equilibrium
12		Test
13	MAY 3rd week	Unit 2nd -Electrochemistry part 1:-Introduction and some imp. Term, electrolytic conduction
14		factors affecting electrolytic conduct ion, specific conductance, molar conductance, equivalent conductance and relation among them
15	MAY 4th week	Arrhenius theory of ionization, Ostwald's Dilution Law
16		Debye- Huckel – Onsager's equation for strong electrolytes (elementary treatment only)
17	JUNE 1st week	Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution
18		degree of dissociation

19	JUNE 2nd week	determination of Ka of acids determination of solubility product of sparingly soluble salts
20		Numerical on the bases of eq. conductivity.
21	JUNE 3rd week	Part 2nd :- Conductometric titrations weak acid vs weak base and strong base
22		conductometric titrations of strong acid vs strong base
23	JUNE 4th week	conductometric titrations of strong acid vs strong base and weak acids
24		Concepts of pH and pKa
25	JULY 1ST week	Buffer solution, Buffer action
26		Migration of ions
27	JULY 2ND	Calculations of Ph of buffer mixtures.
28		Calculations of Ph of buffer mixtures by Henderson – Hazel equation,
29	JULY 3RD	Buffer mechanism of buffer action.
30		Numerical problems on the bases of conductivity, specific conductivity and degree of dissociation.
31		Test of 2nd unit.

LESSON PLAN OF PHYSICAL CHEMISTRY FOR B.Sc. 6th SEMESTER SESSION 2021-2022

NAME OF LECTURE:-DR.PARVESH GUPTA

SUBJECT: - PHYSICAL CHEMISTRY

SR.NO.	DATE	TOPIC
1	April 1st week	Introduction to statistical mechanics Need for statistical thermodynamics, thermodynamic probability
2		Maxwell Boltzmann distribution statistics
3	April 2nd week	Born oppenheimer approximation, partition function and its physical significance
4		Factorization of partition function and ensemble.
5	April 3rd week	Part 2nd :- Photochemistry:- Interaction of radiation with matter, difference between thermal and Photochemical processes.
6		Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence),
7	April 4th week	Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence
8		phosphorescence, non-radiactive processes (internal conversion, intersystem crossing)
9	MAY 1st week	quantum yield, photosensitized reactions-energy transfer Processes (simple examples).
10		Photo chemical equlibria, photo inbhitors and photo stationary state
11	MAY 2nd week	Difference between phosphorescence and fluorescence, luminncence. Example of photochemical reactions and their mechanism.
12		Quenching of fluorescence –stern volumer equation.
13	MAY 3rd week	Unit 2nd :- Solutions, Dilute Solutions and Colligative Properties:- introduction, mode of expressing the concentration of a solution, molar free energy,
14		Fugacity and activity and activity coefficient. Ideal and non-ideal solutions,
15	MAY 4th week	Dilute solutions, Raoult's law. Colligative properties: (i) relative lowering of vapour pressure (
16		Thermodynamic derivation of relative lowering of vapour pressure.

17	JUNE 1st week	Experimental determination of l.w.vapour pressure, elevation in boiling point.
18		Experimental determination in elevation in boiling point.
19	JUNE 2nd week	Relation between l.w.vapour pressure and elevation in boiling point.
20		depression in freezing point., Experimental determination in depression in freezing point
21	JUNE 3rd week	Thermodynamic derivation of relation between amount of solute and elevation in boiling point and depression in freezing point.
22		Osmotic pressure, osmosis, and law of osmotic pressure. semi permeable membrane
23	JUNE 4th week	Thermodynamic derivation of Osmotic pressure
24		Experimental determination of Osmotic pressure
25	JULY 1ST week	Applications in calculating molar masses of normal, dissociated and associated solutes in solution
26		Part2nd :- Phase Equilibrium:- Statement and meaning of the terms – phase, component and degree of freedom
27	JULY 2ND	thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water system
28		Example – sulphur system, Phase equilibria of two component systems
29	JULY 3RD	solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead.
30		Test

Lesson Plan (April 2021 - July2022)

Name of Assistant Professor: Dr.Parvesh Gupta

Subject: Inorganic Chemistry

Class: B.Sc. I (II SEM)

S.N	Month	Week	Topic
1.	April	I	Hydrogen Bonding, Vander Waal's forces, Metallic Bonds, Semiconductors
		II	S-Block elements, Comparative study of the elements including diagonal relationship Anomalous behaviour of Lithium and Berylium compared to other elements in the same group,
		III	Salient features of hydrides, oxides halides, hydroxides
		IV	Behaviour of solution in liquid ammonia, Introduction to Chemistry of noble gases, general physical properties
2.		V	Low chemical reactivity, chemistry of xenon, Structure and bonding in fluorides
	May	I	Structure and bonding in Oxides and oxyflourides of xenon
		II	P-block elements, electronic configuration, atomic and ionic size definition, methods of determination or evaluation, trend in periodic table (in s and p-block elements)
		III	Metallic character, melting point, ionization energy,
			Electron affinity, electronegativity, inert pair effect, and diagonal relationship
3.		IV	Boron family: Diborane: preparation, properties and structure
		V	Diborane structure, Structure and bonding in fluorides
	June	I	Borazine: chemical properties and structure
		II	Relative strength of trihalides of Boron as Lewis acids, structure of aluminium chloride

4.		III	Carbon family and Nitrogen family: Catenation, carbides, fluorocarbons, silicates Oxides:
	June	IV	Structure of oxides of nitrogen and phosphorus, oxyacids
		V	Structure and relative strength of oxy acids of nitrogen
	July	I	Structure and relative strength of oxy acids of phosphorus
		II	Structure of white and red phosphorus
		III	Halogen Family: interhalogen compounds: properties and structure
		IV	Hydra and oxy acids of chlorine- structure and comparison of acid strength Cationic nature of iodine