atpstar
Super Learning Platform

Champion (C-2 Batch) Lecture Plan & Sequence_Maths		
Chapter Name	**Lecture No.**	**Topic**
Basic Mathematics	**1**	Number theory
	2	Divisibility
	3	Surds, Rationalisation
	4	Algebric indentities
	5	System of equation, componendo & dividendo, basics of Q.E, Cubic Equation
	6	Factor and remainder theorem
Set Theory	**1**	Types of sets
	2	Algebra of set, Venn diagram
	3	Inequality basics
	4	Inequality advanced
Compound Angle	**1**	Trigonometric Ratio
	2	Trigonometric Identities
	3	Reduction of Angle F
	4	Graph of Trigonometric Functions F
	5	Range of Trigonometric function & TRigonometry of Compound angle
	6	Transformation Formulae
	7	Sum of sine & Cosine Series
	8	Problem Solving
	9	Conditional Identities
	10	Sum of Trigonometric Series
Quadratic Equation	**1**	Intro to Q.E
	2	Identity, roots, relation between roots & cofficients
	3	Formation/Theory of equations
	4	Nature of roots
	5	Graph of Q.E
	6	Range of Q.E
	7	location of roots
	8	location of roots
	9	Problem Solving
	10	Miscellaneous
Relation	**1**	Relation
Function	**1**	Introduction of Function , Domain of Function
	2	Modulus Function
	3	Greatest Integer function , Fractional Part Function
	4	Signum Function , modulus function , logarithmic function
	5	Transformation of graph
	6	Problem solving
	1	Basic & General Term Of A.P
	2	Sum of n Terms of A.P
	3	Arithmatic Mean AND General Term of
	4	Introduction of GP , Sum of G.P

Sequence & Series	**5**	Problem Solving & Sum of Infinite
	6	Geometric Mean AND Harmonic Progration & Relation Bw AM, GM, HM
	7	Problem Solving (AM GM) **AND** Arithematic Geometric Prograssion
	8	Summation by Sigma operator & method of Difference **AND** Sum of Special Series (Problem Solving)
Binomial Theorem	**1**	General Term of a Binomial Expression
	2	Genral term middle term numerically Greatst term
	3	Sum of binomial Cofficiance
	4	Sum of Binomial Series & Multinomial Theorem **AND** Analysis of Integral & Fraction Part of Binomial Expression
	5	Binomial theorem for any index **AND** Application of Binomial Theorem
	6	NTA Abhyas
Permutation & Combination	**1**	Fundamental Principle of Counting
	2	Factorial & Exponent of Primr Number
	3	Permutation
	4	Permutation & Rank of Word
	5	Combination **AND** Problem Solving
	6	Geometric Application of nCr
	7	Permutation of alike Objects & Number of Divisors
	8	Division & Distribution
	9	Distribution of alike Objects **AND** Station problem
	10	Circular permutattion
	11	Principal of inclusion and exclusion
	12	Derangement and summation of number
	13	NTA Abhyas
Determinant(Basics)	**1**	Basic of Determinant
	2	Properties of Determinant
Straight Line	**1**	General Introduction , Family of Quadrilteral
	2	area of traingle , condition of colinearity
	3	Locus
	4	Slope, Diff forms of St. Line
	5	Angle B/w Straight Line, position of a point wrt a line
	6	Condition of concurrency
	7	Family of Straight lines
	8	Origin Shifting , Angle Bisector
	9	Pair of Straight line
	10	Homogenisation , Problem Practice
	11	NtA Abhyas
Circle	**1**	Basics of circle **AND** equation of circle
	2	Position of a point, length of intrecept **AND** Tangent of circle
	3	Pair of tangent , chord of contact **AND** direct circle, power of point normal to circle
	4	Analysis of circle **AND** problem solving
	5	Common chord of two circles **AND** angle of intersection of two circle
	6	Family of circles **AND** radical axis & radical centre
	7	NTA abhyas
	1	Basics Of Conic Section **AND** Parabola
	2	Focal Chord **AND** Problem Solving

Parabola	**3**	Tangent Of Parabola **AND** Properties Of Tangents
	4	Problem solving **AND** Normal To Parabola
	5	Co-Normal Points **AND** Problem Solving(Normal & Co-Normal Points)
	6	Pair Of Tangent,Chord Of Contact,Diameter
	7	NtA abhyas
Ellipse	**1**	Definition , Eccentricity
	2	Directrix & Focal directrix property, Auxiliary and Ecentric circle
	3	Postion of a point wrt ellipse, line & ellipse ,
	4	Eq of chord of ellipse, tangents,
	5	Normal , Eq of Normal & tangents
	6	Miscellaneous , Problem Solving
Hyperbola	**1**	Basic Of Hyperbola **AND** Auxiliary Circle, Eccentric Angle, Focal Distance **AND** Problem solving
	2	Conjugate Hyperbola **AND** Asymptotes Of Hyperbol
	3	Tangent Of Hyperbola **AND** Chord Of Contact,Director Circle
	4	Normal To Hyperbola **AND** Diameter & Standard Property Of Hyperbola
	5	Reflection Property Of Hyperbola **AND** Rectangular Hyperbola
Trigonometric Equation	**1**	Introduction, General Solution of Trig. Eq.(type-1, type-2, type-3)
	2	type-4, type-5, type-6
		Trigonometric Inequalities
		Solving System of Trigonometric Eq.
		NtA abhyas
SOT	**1**	Sine & Cosine Rule
	2	Tangent Rule , Projection Rule & Area Of Triangle
	3	Circumecircle **AND** Incircle
	4	Orthocentre & Pedal Triangle **AND** Centroid & Length Of Median
	5	Half Angle Formulas AND M-N Theorem
	6	Escribed Circle **AND** Regular Polygon
Statistics	**1**	Introduction , Measure of Dispersion , Mean Deviation
	2	Variance & Standard Deviation
	3	Analysis of Frequency Distribution , Problem Solving
Mathematical Reasoning	**1**	Lecture -1

Champion (C-2 Batch) Lecture Plan & Sequence_Chemistry		
Chapter Name	**Lecture Number**	**Subtopics**
Mole Concept	**1**	Electron, Proton, Neutron Calculation
	2	Mole Calculation based on no of particles, mass, volume
	3	Problem solving on mole calculation
	4	Application of percentage
	5	Empirical formula & Molecular
	6	Stoichiometry and It's application
	7	Mixture problems

	8	POAC and It's applications
	9	Concentration terms, % W/W, % W/V,
	10	Molarity, Molality and It's applications
	11	Dilution, Mixing and Neutrallisation reactions
	12	Volume Strength
Atomic Structure	**1**	Discovery of e⁻, P, n, Millikan oil drop experiment
	2	Earlier model of an atom, Rutherford
	3	Maxwell theory of EMR, Planck's quantum theory
	4	Black body radiation, Photoelectric effect
	5	Bohr model of an atom
	6	Application of Bohr model
	7	Spectrum and its application
	8	De-Broglie and Heisenberg Concept
	9	Schrodinger Wave Mechanical Model
	10	Quantum Numbers
	11	Application of quantum numbers,
	12	Electronic configuration and its
	13	Radial wave function, Probability
Periodic Table	**1**	General Introduction of Periodic Table
	2	Group Number, Period Number and Basic Inorganic
	3	Effective Nuclear Charge (Z effective)
	4	Atomic & Ionic Radius & Lanthanoid contraction
	5	Ionization Energies
	6	Electron Gain Enthalpies
	7	Electro negativity
	8	Diagonal Relationship and Periodic Characteristics
	9	Complete Discussion of DPP and MPP
Chemical Bonding-1	**1**	Types of bonding (Definitions of Ionic bond Covalent bond and Metallic bond)
	2	Octet rule, Limitations of octet rule, Formal charge
	3	Writing the lewis dot structure
	4	Writing resonating structures, finding average bond
	5	Stability of resonating structures, Finding bond order
	6	VBT, overlapping of orbital, Hybridisation
	7	VSEPR Theory
	8	Hybridization
	9	Hybridization
	10	Bond angle
	11	Bond length / Bond Strength
	12	Type of p bonding (p□-p□ & p□-d□ bond) & Coordinate bonding.
	13	Electron deficient bonding & Back bonding
	14	Van der Waal's Forces (Dipole)
	15	Van der Waal's Forces (Hydrogen Bonding)
	16	Molecular Orbital Theory
	17	Application of Molecular Orbital Theory
	18	Metallic Bonding, Fajan Rule
	19	Dipole moment
	20	Acidic and Basic Character
	21	Complete Discussion of DPP and MPP
Gaseous State	**1**	Parameters used to define a gas, Barometer, Manometer
	2	Gas Laws
	3	Application of Gas Laws
	4	Problems related to container
	5	KTG
	6	Problem Solving on KTG, Maxwell
	7	Graham's law, Diffusion/Effusion
	8	Real Gas, Derivation of Wander Waal

	9	Compressibility factor and its
	10	Andrew's Isotherm
Redox Reaction	**1**	Concept of oxidation and Reduction
	2	Calculation of oxidation Number
	3	Balancing of redox reaction ion
	4	Oxidation Number method
	5	Equivalent Concept and n_f calculation
	6	n_f calculation part-2
	7	Titration and its application
	8	Problem solving on titration
	9	Lodi and Lodometric titration, back and double titration
	10	Hardness of water
Chemical Equilibrium	**1**	Types of reaction on the basis of
	2	Types of equilibrium, Law of mass action, Equilibrium Constant, Types of Equilibrium constant K_p, K_c and K_x
	3	Equilibrium constant for various
	4	Numerical Approach using mole method
	5	Numerical approach using degree of dissociation method
	6	Mixed Problem Solving
	7	Calculation of degree of dissociation using vapour density method, Lechalelier principle
	8	Effect of P, V and T on various
	9	Physical Equilibrium
Ionic Equilibrium	**1**	Different theories of acid and base, Conjugate acid-base pair concept, Auto photolysis constant of water
	2	Relation between K_a and K_b of conjugate acid-base pair, pH scale, Electrolytes and non electrolysis, Arrhenius theory of
	3	Common ion effect, Ostwald dilution law, pH of strong acid, Strong base
	4	Mixture of Strong acid and Strong base, Weak monoprotic acid, Weak base
	5	Mixture of strong acid and weak acid, Mixture of two weak acid, Polyprotic acid
	6	Concept of anionic and cationic hydrolysis, pH of salt of strong acid and strong base, Salt of weak acid and strong base
	7	Salt of strong acid and weak base, Salt of weak acid and weak base, Case of amphiprotic anion
	8	Buffer solution, Acidic buffer, Basic buffer and their pH
	9	Effect of addition of strong acid and Strong base on buffer solution, Buffer capacity
	10	Indicators and titration curve
	11	Sparingly soluble salt and K_{sp}
	12	Application of solubility product
	1	Fundamental of thermodynamics system, Surrounding, Boundary, Types of System, State Variables Extensive and intensive properties, Types of thermodynamics process.
	2	Reversible and Irreversible Process, State and Path functions, Total energy and internal energy, Standard state, Zeroth law, First law basis

Thermodynamics	**3**	Work heat, Their sign conventions, Internal energy, Internal energy for an ideal gas and Enthalpy
	4	Problem solving on internal energy and enthalpy, Kirchoff law and its application
	5	Work in isochoric, Isobaric, reactions taking place at constant P and T, Isothermal process
	6	Comparison between rev. and irr. Isothermal process, Adiabatic process, Comparison between rev, and irr. Adiabatic process
	7	Comparison between rev. isothermal and rev. adiabatic, Problem solving on isothermal and adiabatic process
	8	Polytrophic process, Cyclic process and their application
	9	Second law of thermodynamics, Entropy Carnot cycle
	10	Clausivs inequalities, Entropy y calculation for system in case of general substance and ideal gas
	11	Entropy calculation in isothermal and Adiabatic ideal gas process, Entropy in physical process and chemical reactions.
	12	Problems solving on entropy in various process
	13	Third law of thermodynamics Gibbs energy, Condition for
	14	spontaneity.
	15	Physical significance of G, Variation of G with P and T
	16	Gibbs free energy and equilibrium constant

S-Block Element (Hydrogen)	**1**	Nitrogen family and Chemical and physical properties
	2	Synthesis and Reactions of N_2, NH_3, Oxide of Nitrogen, HNO_3
	3	Different Phosphorous Allotropic forms and Reaction of PH_3, PCl_3, PCl_5
	3	Different Oxides of Alkali Metals and Solubility in liquid NH_3
	4	Important compounds of S-block (NaOH and its reactions)
	5	Introduction and General Trends of Alkaline Earth Metals
	6	Important compounds of S-block (Washing Soda,
	7	Solubility in water + Thermal Decomposition of Carbonates, Sulphate, Hydroxide of S-Block Elements
P-Block Element (13 & 14 Group)	**1**	Introduction to Boron Family & General Trends
	2	Occurrence, Preparation & Chemical Reactions of Boron
	3	Important compounds of Boron
	4	Important Compounds of Aluminium
	5	Introduction to C family & general trends
	6	Allotropes of Carbon (Diamond, Graphite, Fullerene)
	7	General Reactions of Important compounds of Carbon Family
	8	Silicates and Silicones
	1	Intro Organic Chemistry

IUPAC	**2**	Bond Line Notation
	3	Degree & DBE
	4	Naming of Alkane
	5	Naming of Alkene, alkyne & cyclic
	6	Functional Group
	7	Polyfunctional
	8	Aromatic Compounds
GOC	**1**	Inductive Effect
	2	Intermediates in Organic
	3	Stability of Intermediates
	4	Resonance
	5	How to Draw Resonance Structures
	6	Comparing Stability of Resonating Structures
	7	Aromaticity
	8	Resonance Energy
	9	Hyper Conjugation
	10	Application of RHI
	11	SIR Effect
	12	Acidic Strength
	13	Basic Strength
	14	Basic Strength Advanced
ISOMERISM	**1**	Structural Isomerism
	2	Calculation of Structural Isomerism
	3	Tautomerism
	4	Sawhorse, Newman Projection
	5	Fischer Projection
	6	Conformational Isomerism
	7	Application of Conformational Isomerism
	8	Conformation of Cyclohexane
	9	Geometrical Isomerism
	10	Geometrical Isomerism Calculation
	11	Chiral Center and Polarimeter
	12	R, S Configuration and POS
	13	Optical Activity and Symmetry
	14	Cummelens, Spiral & Biphenyls
	15	Enantiomer & Diastereomer
	16	Concept in Optical Isomerism (Advanced)
	17	Calculation of Stereoisomers
BASICS OF ORGANIC	**1**	Electrophile & Nucleophile
	2	Solvent, Leaving Group and Nucleophilicity
HYDROCARBON	**1**	Reaction of Alkanes
	2	Photohalogenation
	3	Photohalogenation (Advanced)
	4	Use of NBS
	5	Markovnikov Addition of Alkenes
	6	Rearrangement of Carbocation
	7	Ring Expansion, KCP and TCP
	8	Peroxide Effect
	9	Syn Addition Reaction
	10	Bromine Addition, Halo Hydrin Formations
	11	Acid Catalyzed hydration of Alkene
	12	Oxymercuration and Demercuration
	13	Syn anti Addition (Advanced)
	14	Hydroboration Oxidation
	15	Kucherov Reaction
	16	Ozonolysis
	17	Epoxidation
	18	Use of hot $KMnO_4$

Champion (C-2 Batch) Lecture Plan & Sequence_Physics		
Chapter Name	**Lecture No.**	**Topic**
Mathematical Tools	1	Functions
	2	Differentiation
	3	Rules of Differentiation
	4	Maxima & Minima
	5	Integration
	6	Vectors
	7	Dot Product of Vectors
	8	Cross Product of Vectors
	9	Graph Theory
	10	
Rectilinear Motion	1	Distance, Displacement, Speed
	2	Velocity, Acceleration
	3	Equations of Motion
	4	Motion under gravity
	5	Variable Acceleration
	6	Graphs
	7	Problem solving on Graphs
Projectile Motion	1	Ground to ground Projectile
	2	Projectile from a tower
	3	Projectile on an inclined plane
	4	Problem solving
	5	
Relative Motion	1	Introduction
	2	Relative Motion in 2-D, Rain-Man problems
	3	Aeroplane problems, River problems
	4	Relative motion of 2 projectiles
NLM	1	Force, classification, Gravity, weight
	2	Normal, Tension, Newton's Laws
	3	F.B.D., Constrained motion
	4	Constrained motion
	5	Application of Newton's Laws, Block problems
	6	Massive rope, Weighing machine
	7	Spring, Cutting of spring
	8	Pseudo Force
Friction	1	Introduction
	2	Angle of friction, Push and pull of a body
	3	Angle of Repose, Questions
	4	2 Block problems
	5	3 Block problems
Work, Power & Energy	1	Work done by constant force, variable force
	2	Kinetic energy, Work Energy theorem
	3	Work by spring, gravity, friction
	4	Conservative & Non-conservative force
	5	Potential energy, relation b/w PE & force
	6	Equillibrium, Conservation of mech. Energy
	7	Problem solving
	8	Power

	9	Problem solving (questions on water pump)
	10	
Circular Motion	1	Angular position, displacement, velocity
	2	Acceleration in circular motion
	3	Relative angular velocity
	4	Uniform and non-uniform circular motion, Radius of curvature
	5	Dynamics of circular motion
	6	Centrifugal force
	7	Banking of roads
	8	Vertical circular motion
	9	
COM	1	COM of system of particles
	2	COM of continuous mass distribution (Semi circular ring and disc)
	3	COM of hemisphere and cone
	4	COM of bodies with cavity
	5	Motion of COM
	6	Momentum and its conservation
	7	Problem solving, Gun-bullet systems
	8	Impulse
	9	Reference Frame of COM
	10	Collision, types, head-on
	11	Elastic and Inelastic collisions
	12	Problem solving on collision
	13	Oblique Collision
	14	Problem Solving
	15	Variable mass systems
	16	Problem Solving
RBD	1	Introduction, Types of rotational motion, MOI of a point mass
	2	MOI of continuous mass distribution
	3	MOI of continuous objects
	4	MOI of composite objects, Perpendicular axis theorem
	5	Parallel axis theorem
	6	MOI of objects with cavity
	7	Radius of gyration, Relative angular velocity of 2 particles on a body
	8	Torque
	9	Torque about an axis, Couple
	10	Newton's second law for rotational motion
	11	Problems on string and pulley, force at hinge
	12	Angular Momentum of different systems
	13	Angular Momentum in pure rotation
	14	Angular momentum conservation
	15	CTRL, Pure rolling
	16	Rolling with slipping, KE in CTRL
	17	Problem solving on pure rolling
	18	Pure rolling on moving platform and on inclined plane
	19	Pure rolling on moving platform and on inclined plane
	20	Angular momentum in CTRL
	21	Problem solving on angular momentum in CTRL and collision
	22	Angular impulse
	23	Statics, Equillibrium
	24	Toppling

Elasticity	1	Stress, Strain, Hooke's Law
	2	Elastic Potential Energy
	3	Problem solving
Fluid Mechanics	1	Fluid properties, Pressure, Assumption in fluid statics,
	2	Pressure Measurment and its variation with depth, Atm. Pressure
	3	Pascals law, Hydraulic force
	4	Hydrostatic force
	5	Barometer, Manometer, Archimedes principle & Buoyant force
	6	Buoyant force, Stability of body immersed in a fluid
	7	Apparent weight, Pressure variation in vertically accelerated fluid
	8	Pressure variation in horizantally accelerated fluid
	9	Pressure variation in rotating fluids
	10	Fluid Dynamics
	11	Fluid Dynamics
	12	Fluid Dynamics
	13	Viscosity
	14	Surface Tension Introduction, Surface Energy
	15	Surface Energy of Bubbles and drops
	16	Excess Pressure
	17	Angle of contact
	18	Capillary action
	19	Combination of two bubbles, Force on plates with fluid b\w them
Calorimetry	1	Heat, Specific Heat, Heat Capacity, Water equivalent.
	2	Question on water equivalent, Latent heat
	3	Question on water-ice-steam mixture.
Thermal Expansion	1	Temperature, Zeroth law of Thermo., Thermal expansion of solids
	2	Linear expansion, Problem solving
	3	Superficial & Volumetric Expansion, Relation b/w a, b & g
	4	Thermal Expansion of Fluids, Effect of Temp. on buoyant force
	5	
KTG	1	Assumptions, definition of moles, molar volume, molar mass, ideal gas
	2	Boyle's law, different graph, charles law, different graph, Gaylussac's law, graph, ideal gas equation, Universal Gas constant.
	3	Avagadro's law, Pr. Due to gas on the Container wall,
	4	RMS speed, effect of temp & pressure on RMS speed, Avg. K.E., different forms of K.E.
	5	Maxwells law of distribution of molecular speed, different velocities of gas molecules,
	6	Mean free path, degree of freedom, law of Equipartition of energy.
	7	Heat, gram Sp. Heat, molar sp. Heat, Gram & molar Sp. Heat at constant volume & pressure, Mayor's formula, Ratio of sp. Heat

	8	Sp. Heat in terms of Degree of freedom, value of g in for monoatomic, Diatomic & Triatomic Gases,
	9	Mixing of gases, C_p, C_v, g, f of mixture, Question
	10	Faulty Barometer, Question, Vander-wal's equation
	11	
Thermodynamics	1	System, Surrounding, Types of System, properties, intensive & extensive properties, State of system, Process, Cycle, Zeroth law of Thermodynamics
	2	internal energy, change in intenal energy, Heat work, Calulation of work done, Question
	3	Question Continue, work done for Const Volume process, W.D. for isobaric process, for isothermal process, for Adiabatic process,
	4	Comparision b/w isothermal & Adiabatic process, Question Reversible & irrvessible process, first law of thermodynamics, FLOT for a cycle, Question
	5	FLOT for different processes, Polytropic process, W.D. & Sp. Heat in Polytropic process, Question
	6	Questions Continue, Conversion of Graph, Questions,
	7	General formula for molar sp. Heat of all process, Question, free expansion
	8	Seond law of thermodynamics, Source, sink Kelvin - plank statement, Efficiency of cycle, Heat engine
	9	Question Heat enigine, Carnot cycle, Question
	10	Refrigerator
S.H.M.	1	Oscillatory motion, Basics of SHM, Representation and equation of SHM
	2	Velocity and accelration in SHM, Phaser, Questions
	3	Energy in SHM, Questions on energy
	4	Spring block system, Combination of Spring,
	5	Cutting of spring, Energy method to Find time period
	6	Angular SHM
	7	Compound Pendulum
	8	torsional Pendulum
	9	Combination of SHM
	10	Damped Oscillation
Mechanical Waves	1	Basics of waves, Types, Different Termsof waves, Transverse and Long. Waves
	2	Wave equation, Questions
		Phasors, Sinusoidal waves, General equation of wave, Questions
		Wave velocity General Expression, Wave speed on string
		Energy on wave
		Power and intensity
SUPERPOSITION OF WAVES & STANDING	1	Principle of superpostion, Question on wave superpostion
	2	interference, Question (on intensity & Amp. Of resultant wave)
	3	Reflection & transmission of waves 1
	4	Reflection & transmission of waves 2
	5	Standing wave Different eq. of string wave Cocept of Node & Antinode, Question

STANDING WAVES	6	Fundameutal freq, overtone, Harmonics, Resonance, Question
	7	Standing wave in string fixed at both ends & at one end, Question, mixed problems
	8	Standing wave in Composite string, Sonometer
	9	Energy of string wave, power
SOUND WAVES	1	Long. Wave, Disp wave, pr, wave eqn., Question
	2	Speed of sound waves, Newtons formula, Laplace, Correction
	3	Power intersity, charctestics of sound wave
	4	interference of sound waves, Quinke's tube
	5	Organ pipes, close & open, Question
	6	End Correction, Kundt's tube, Beats Question
	7	Doppler's effects
	8	Doppler effects
UNIT AND DIMENSION AND ERROR ANALYSIS	1	Physical quantity, Types Fundamertal & Derived Qty, Supplementry qty,
	2	Units, Types of unit system, Dimensions, Dimensional Analysis and Applications
	3	Error types, Error in Addition, Subtraction, etc.
	4	Questions on Error, Significant Figures,
	5	Vernier Caliper,
	6	Screw Gauge