

Apex Institute, George Town Allahabad

0532-2465490, 9721755463 & 8423444811

New Syllabus of CPMT 2012

(Please correlate it with U.P. Board syllabus 2012 or CPMT syllabus 2012)*

ZOOLOGY

1. **Biological Molecules**
 - a. Synthesis of biological molecules
 - b. Structure and interactions of atoms and molecules
 - c. Importance of water and mineral in life
 - d. Carbohydrates
 - e. Lipids
 - f. Proteins
 - g. Nucleic Acid
2. **DNA: the molecules of heredity**
 - a. Life composition of chromosome, nucleosome model
 - b. Structure of DNA
 - c. Replication of DNA
3. **Gene Expression and Regulation**
 - a. Relation between gene and proteins
 - b. Role of RNA in protein synthesis
 - c. Effect of mutations on the functions of genes
 - d. Regulation of gene expression
4. **The Continuity of life : Cellular reproduction**
 - a. Essential feature of cell division
 - b. Free cell division and budding
 - c. Events of Eukaryotic cell
 - d. Phases of mitosis
 - e. Events of cytokinesis
 - f. Function of mitotic cell division
 - g. Phases of meiosis
 - h. Role of mitosis and meiosis in Eukaryotic life cycle
 - i. Role of meiosis and sexual reproduction in producing genetic variability
5. **Patterns of Inheritance**
 - a. Mendel's crosses as foundations for modern gene
 - b. Single trait inheritance
 - c. Multiple trait inheritance
 - d. Sex determination
 - e. Inheritance of sex linked genes
 - f. Deviation from Mendelian theme
 - g. Investigating human genetic disorders
 - h. Errors in human chromosome number
6. **Genetic engineering**
 - a. Eugenics
 - b. DNA Recombination in nature
 - c. Recombinant DNA Technology
 - d. Applications of genetic engineering

7. Organic Evolution

- a. Evolution of evolutionary thought
- b. Evidence in support of Evolution
- c. Evolution of population by natural selection
- d. Relation between population genes and Evolution
- e. Causes of Evolution
- f. Process of natural selection
- g. Causes of extinction
- h. Features of species
- i. Formation of new species
- j. Maintaining reproductive isolation
- k. Role of speciation

8. The hidden world of Microbes

- a. Virus, viroids and prions
- b. Origin of Prokaryotic remains
- c. Origin of kingdom protista
- d. Origin of life and vasiating the land
- e. Evolutions of man

9. Systematics

- a. Naming and classifying organisms
- b. Kingdom of life
- c. Changes in taxonomic categories
- d. Exploring Biodiversity

10. The Animal Kingdom

- a. Characteristics defining an animal
- b. Major evolutionary trends in animal
- c. Short study for major animal phyla
- d. Phylum Protozoa, parasites, *Amoeba*
- e. Phylum Porifera, sponge
- f. Phylum Cnidaria, *Hydra*, *Anaemone* & Jelly fish
- g. Phylum Platyhelminthes : the flat worm
- h. Phylum Nematoda : the round worm
- i. Phylum Annelids : The segmented worm-earthworm
- j. Phylum Arthropoda : Insects, Arachnids and crustaceans; cockroach, housefly, mosquito, economic importance of insects for human
- k. Phylum : Mollusca : introduction with reference to *Pila*
- l. Phylum : Echinodermata : introduction with reference to star fish
- m. Phylum : Chordata : Classification & Vertebrata

ANIMAL ANATOMY AND PHYSIOLOGY (human):

11. Homeostasis and organisation of animal body

- a. Maintaining internal constancy
- b. Animal tissue and body organization

12. Nutrition and Digestion

- a. Nutrients needed by animal (Human)
- b. Digestive system of man and comparison of rabbit
- c. Mechanism of digestion of food

13. Circulation

- a. Features and functions of circulatory system
- b. Features and function of human heart
- c. Composition and function of the blood

- d. Structure and function of blood vessels
 - e. Structure and function of lymphatic system
- 14. Respiration**
- a. Evolutionary adaptation for gas exchange
 - b. Cellular respiration
 - c. Mitochondria and functions of ATP & ADP
 - d. Features and functions of human respiratory system
- 15. Urogenital System**
- a. Excretion in simpler animals
 - b. Feature and function of human urinary System
 - c. Process of animal reproduction
 - d. Working of human reproductive system
 - e. Limiting the fertility
 - f. Human health and diseases
 - g. Human population, growth and control
- 16. Nervous system and Senses**
- a. Difference between nervous and endocrine communication
 - b. Structure and functions of neurons
 - c. Generation and communication of nervous activity
 - d. Complex design of nervous system
 - e. Organization of human nervous system
 - f. Function of sensory receptors
 - g. Sensing the sound : The EAR
 - h. Sensing the light : EYE
 - i. Sensing the chemicals : Smell and taste
- 17. Action and support : The Muscles and Skeleton**
- a. Working of muscles
 - b. Function of skeleton
 - c. Tissue that makes skeleton
 - d. Movement in the body
- 18. Defence against diseases : The immune response**
- a. Defending body against invasion
 - b. Key characteristics of the immune response
 - c. Recognition of threat
 - d. Overcoming threats
 - e. Memorizing invaders
 - f. Medical aids helping immune action
 - g. Malfunction of immune system
- 19. Chemical control of the animal body : Endocrine System**
- 20. Human Embryonic Development**
- a. Cleavage during embryonic development
 - b. Differences between indirect and direct development
 - c. Process of embryonic development
 - d. Human embryonic development
- 21. Animal Behaviour**
- a. Differences between innate and learned behaviour
 - b. Communication between animals
 - c. Interaction between animals
 - d. Human behaviour

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BOTANY

1. **Energy flow in the life of cell**
 - a. Energy and laws of Thermodynamics
 - b. Exergonic and Endergonic Reaction
 - c. Controlling metabolic reactions
 - d. Structure and Function of Enzymes
 - e. Energy carriers and Electron carriers in the cell
2. **Cell structure and Function**
 - a. Basic features of the cell
 - b. Features of Prokaryotic cell
 - c. Features of Eukaryotic cell
3. **Capturing Solar Energy : Photosynthesis**
 - a. Adaptation for Photosynthesis
 - b. Light dependent Reactions
 - c. Light Independent Reactions
 - d. Relationship between light dependent and light independent reaction
 - e. Water carbon dioxide and C₄ Pathway
4. **Harvesting energy from glucose**
 - a. Harvesting energy through Glycolysis
 - b. Cellular respiration giving more energy from glucose
 - c. Fermentation and Economic Importance
5. **Community Interaction**
 - a. Importance of Community Interaction
 - b. Effect of Competition among Species
 - c. Result of Interactions between predators and their prey
 - d. Symbiosis
 - e. Influence of key-stone Species on Community structure
 - f. Succession : Process of Community change overtime
 - g. Pathway of Energy and Nutrients through communities
 - i. Energy flow through communities
 - j. Movement of nutrients within Ecosystems
6. **Earths diverse Ecosystems**
 - a. Factors influencing the Earth climate
 - b. Requirement of life
 - c. Distribution of life on Earth
 - d. Distribution of life in water
7. **Environmental Pollution**
 - a. Acid rain and global warming
 - b. Causes and control of Pollution
8. **Modern Classification of plant kingdom**
9. Formation of Microspores & Megaspores
10. Detailed study of life history of angiosperm up to seed formation

11. Classification of Flowers & Fruits
12. Dispersal of fruit, seeds & dormancy
13. Study of life cycle of important phyla & their representatives
14. Bacteria : Structure, mode of Nutrition, Reproduction & economic importance
15. Fungi : Outline of Fungi, Detailed study of *Rhizopus*, Yeast & their economic importance
16. Algae : Outline of Algae (General Characters, uses) Detailed study of *Spirogyra* & *Ulothrix*
17. Bryophyta : Outline of Bryophytes & their economic importance, detailed study of *Funaria*(moss)

18. Pteridophyta : Outline of Pteridophytes, detailed study of Fern & *Dryopteris*
19. Gymnosperm : General character, life cycle of *Cycas*
20. **Classification of angiosperm** : Detailed study of following families including their identification & economic importance: Cruciferae, Malvaceae, Leguminosae, Compositae, Cucurbitaceae, Solanaceae & Liliaceae
21. **Plants forms and functions**
 - a. Growth in plants
 - b. Roots : and Secondary growth, Absorption
 - c. Complex organisation and Secondary growth
 - d. Leaves : as Solar Pannels
 - e. Special adaptations of Roots, Stems and Leaves
 - f. Process of sequiring Nutrients by plants
 - g. Process of acquiring water by plants
 - h. Transport of water, minerals and sugars
22. **Plant reproduction and embryonic development**
 - a. Features of plant life cycle
 - b. Evolution of flower
 - c. Co-evolution of flowers and pollinators
 - d. Development of Gametophyte in plants
 - e. Pollination leading to fertilization
23. **Plants Responses to Environment**
 - a. Discovery of plant hormones
 - b. Plant hormones and their action
 - c. Hormones as regulator of plant life cycle
 - d. Plant movement
24. **Plant ash & Soil**, chemical composition of inorganic nutrition in water, water absorption by root hairs, osmosis & conduction
25. **Transpiration** : Importance & reason, mechanism of stomatal movement (opening & closing)
26. **Storage and translocation of food materials**

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PHYSICS

(a) Measurement and Kinematics

1. Estimation of percentage error in the result of an experiment.
2. Dimensional analysis; dimension of a physical quantity M,L,T, (Temperature), Dimensional balance of any equation.
3. Motion along straight line path: Time-displacement, time-velocity, and time-acceleration graphs. Interrelationship among the graphs.
4. Motion in a plane : Vector addition and subtraction (Laws of Polygon to be used), $AB + BC = AC$. Graphical deduction has to be emphasized. Multiplication of a vector by a scalar. Uniform motion on a circular path, magnitude of centripetal acceleration and force (Centrifugal force does not exist in inertial frame). Motion under a uniform acceleration along a direction other than that of the initial velocity (motion of projectile under gravity is included here Interpretation of the vector form of the equations of motion

(b) Mechanics

1. **Newton's Law of Motion** : the first law (Galileo's Law of Inertia) and the third law are obtained from the second law ($a = F/m$), variable force, Impulse , conversion of momentum, Principle of jet propulsion.
2. **Rotatory motion of a rigid body**: Torque, angular acceleration, moment of inertia (torque, angular acceleration), angular momentum.
3. **Work Energy**: Derivation of expression for kinetic energy and respectively from work done by a force and by a couple. Potential energy for a general relation (using the method of area under the curve) for a constant force (e.g. mgh) and for spring . Conservation of mechanical energy. Elastic and Inelastic collisions (no description). Law of mechanical energy in inelastic collisions.
4. **Universal Gravitation** : Motion of planets, Kepler's law, Law of gravitation in terms of central force dependence of force on and inverse of square of distance (no derivation). Planets, orbital motion and time period, concept of weightlessness. Gravitational field (Nt/Kg) and potential (J/Kg). Height attained by the projectile, escape velocity.
5. **Simple harmonic motion** : Pure kinetic motion in terms of projection of uniform circular motion. Formula . Magnitude of acceleration is , kinetic description that motion in which the force is $-kd$. Relation and its uses in (i) Simple Pendulum (ii) Oscillation in an ideal spring. Time displacement graph, time period, frequency, phase. Total energy in terms of square of amplitude, conversion of energy in the form of potential and kinetic energies, dissipation and damping.
6. **Forced oscillation and resonance** : Elementary concept of forced oscillations, cases of resonance - examples from mechanics, sound and radio etc.

(c) Wave Motion and Sound

1. **Speed of mechanical waves** : Newton's formula (no derivation) for longitudinal waves. Order of magnitude of v in various media. Application to gases, Laplace's correction, effect of temperature and pressure for waves on string (no derivation).
2. Progressive wave : Equation for a simple harmonic progressive wave, phase difference, Wave front graphical representation of particle velocity against x and t . Qualitative picture of pressure variations in longitudinal waves, intensity dependence on square of amplitude (no derivation).
3. Reflection and refraction of waves : Demonstration of characteristics of wave motion with the help of pulse on a string and on water. Mutual independence of various waves in the same medium. Partial reflection and transmission at the interface of two media, Explanation of reflection and refraction on the basis of secondary wavelets and new wave front.
4. **Superposition of waves** : Interference in space due to two sources, phenomenon of beats, beat frequency equals the difference of parent frequencies.
5. **Stationary waves** : Bounded medium, stationary waves, nodes and antinodes, Characteristic frequencies of vibration of a bounded medium. Cases of string and air columns (excluding end correction etc.) Monometers, Melde's experiment, Resonance column and Kaundt's tube.
6. **Doppler's Principle** : Doppler effect due to the motion of the source and due to the motion of the observer.

(d) General Properties of Matter

- Kinetic theory and ideal gases** : 1. Molecular agitation, deduction of pressure of an ideal gas, Boyle's Law, Kinetic theory - concept of thermal equilibrium and temperature, Perfect gas equation, deviation from the ideal gas equation at high pressure and low temperature, concepts of finite size of molecules and their mutual interactions. Distinction between gases and vapors, critical temperature.
2. **Kinetic models for liquids and solids** : Intermolecular forces and potential energy curve. Molecular models for the liquids and solids, Elementary explanation for thermal expansion, fusion. Vaporization, boiling and latent heats.
 3. **Elasticity** : Longitudinal strain, stress and modulus of elasticity. Explanation on the atomic models of solids. Estimation of interatomic force constant. Bulk modulus and rigidity (Only elementary ideas).
 4. **Surface tension** : Surface tension, surface energy. Elementary explanation on the basis of inter molecular forces. Rise of liquid in a capillary tube.
 5. **Flow of liquids** : Ideal fluids, Bernoulli's equation and its application : Viscous fluids (elementary concepts only), viscous force on a solid moving in fluid, Stokes's Principle (no derivation), terminal Velocity.

(e) Heat

1. **Thermometry** : Constant Volume gas thermometer, Principles of Resistance Thermometer and principle of the thermocouple, thermometer. Range of various thermometers. Brief explanation of the various other principles used in thermometry. Total radiation, pyrometer and vapour pressure thermometer.
2. **First law of thermodynamics** : work done by a system = $p\,dv$. Definition of the internal energy function U from the relation . First Law of thermodynamics. U as unique function of any state. Distinction between CP and CV Derivation of $CP-CV=R$ for an ideal gas. General features of the

function U . Transitional kinetic energy, intermolecular potential energy, internal rotation and vibration in polyatomic molecules and lattice vibrations.

3. **Isothermal and Adiabatic Processes** : Definitions, Isothermal elasticity of ideal gas. Adiabatic relationship (no derivation), adiabatic elasticity of an ideal gas.
4. **Thermal Conduction** : Elementary concepts of isothermal surface and temperature gradient. Thermal conductivity and one dimensional heat flow in the steady state, kinetic model of thermal conductivity (including metals).

(f) Light

1. **Refraction at spherical surfaces** : Refraction at spherical surfaces. Derivation of the expression for u , v relationship for refraction at a single spherical surface and a thin lens, (Sign conventions of coordinate geometry to be followed) Newton's formula, combination of lens.
2. **Chromatic aberration** : Dispersive power of a material, Longitudinal chromatic aberration in a lens, Achromatic combination two lenses in contact.
3. **Telescope and Microscope**: Astronomical telescope (reflecting, refracting types), compound microscope, magnifying power (for normal eye only). Mention resolving power for both the instruments, need of large aperture telescope and electron microscope (no description). Mention resolving power for both the instruments.
4. **Wave nature of light** : Elementary observation of diffraction of light by a narrow single slit, comparison with the corresponding observations in ripple tank. Explanation of reflection of light and refraction of sound on the basis of the wave theory. Expression $v = c/n$. Foucault's experiment for the measurement of the velocity of light in liquid and its historical significance. Analysis of Young's experiment, Fringe width, Wavelength of light in various regions of white light. Elementary ideas of plane polarized light, its production and detection (Pile of plates and polaroids).
5. **Spectrum** : formation of spectrum in a prism spectrometer, Minimum deviation and angular dispersion, Ultraviolet and infrared regions of the spectrum, Characteristic properties, complete range of the electro magnetic spectrum: radio wave to gamma rays.
6. **Photometry** : Luminous intensity of light source at a point in particular direction. Unit candela (cd). Definition of Lumen (Lm) = 1 cd sr. An isotropic sources of luminous intensity of 1 cd gives a total flux of . Rating of a lamp in lumens, candela or watt, Unit lux illumination of a surface (lx) = lumen/meter², measurement of luminous efficiency in lumens watt, illumination in terms of inverse square law and cosine law. Brief introduction of luminous efficiency, illuminance etc. for various practical cases.

(g) Electricity

1. **Electric field and potential** : Coulomb's Law. Electric field and potential due to a point electric dipole (In longitudinal and transverse position at large distances). Couple acting on a dipole placed in an electric field. Electric field due to a sphere with uniform surface charge density (No Derivation), Proof of atomicity of electric charge. (The procedure of PSSC book to be followed).
2. **Capacitance** : Principle of condenser, capacity of an isolated sphere, a spherical condenser and a parallel plate condenser. Effect of dielectric on the capacity. Series and parallel combination of condensers, energy of a charged condenser, its comparison with the energy of a stretched spring.
3. **Electric conduction** : electric current as a flow of charge carriers. 1 Ampere = 1 coulomb/sec, or electronic fundamental charge/sec. Conduction in gases and solutions, concepts of ions, Electrolysis. Faraday's Law and Electrochemical equivalent, Faraday's number, Free electrons in metals, carrier

density, drift velocity v and relaxation time t , Simple derivation of Ohm's law. Qualitative explanation of the variation of conductivity of normal conductors with temperature. Ohmic and nonohmic circuit elements, Dynamic resistance .

- 4. Simple Circuits :** Electric cell as a device which continuously drives charges round a circuit. Electromotive force a characteristic of cell, EMF defined as $= W/Q$, where W is work done in carrying a charge Q around a closed circuit. Internal resistance of a source (r), Internal potential drop (ir) and power Kirchhoffs Laws : Series and parallel combination of resistances, Principle of Wheatstone's bridge, example of meter bridge. Potential divider, Potentiometer.

(h) Electromagnetism

- 1. Moving charges and magnetic field :** Similarities in the behaviors of bar magnet and solenoid current, measurement of a magnetic field on the basis of force on a linear current , force on a moving charge in a magnetic field (Lorentz force). Relation between these two expressions, force acting between two parallel linear currents . Its interpretation on the basis of magnetic field , Definition of Ampere using the expression and definition of the unit of B using the expression . Magnetic field at the centre of circular coil and inside a long solenoid (no derivation), Principle of moving coil galvanometer, its conversion into Ammeter and voltmeter. Principle of D.C. Motor.
- 2. Magnetism :** Couple acting on a bar magnet placed in a magnetic field, magnetic dipole. Definition of magnetic moment on the basis of couple acting in a magnetic field. Electromagnet. Atomic model of magnetism, some atoms have non-zero moment and their alignment gives rise to microscope magnetism, magnetic field due to a Small bar magnet in longitudinal and transverse positions ($2m/d^3$ and m/d^3 respectively), component of earth's magnetic field, theories regarding its origin.
- 3. Electromagnetic Induction :** Magnetic flux, its unit weber. 1 weber = 1 Newton meter/Ampere. Faraday's law of electromagnetic induction, . Interpretation of induced e.m.f. in terms of Lorentz force. Principle of A.C. and D.C. Dynamos. Back e.m.f. in a motor, definition of self inductance ($e = -L di/dt$). Dependence of L on the core material. Graphical description of rise and decay of current in an inductive circuit (no derivation). Definition of mutual inductance and its dependence on the core material. Theory of transformers (qualitative). Microphone (moving coil and carbon type), moving coil loudspeakers.
- 4. Alternating current circuits :** Graphical representation of voltage and current as a function of time, phases difference between V and I . Value of the ratio of , depends on frequency and the impedance Z for a circuit containing only R and L , and (no derivation), root mean square value , choke coil, watt-less current. Oscillation in an LC circuit, (Statement only). Frequency of an LC circuit, (Anology with oscillation of a mass attached to a spring).

(i) Electrons Physics

- 1. Diode and triode :** Emission of electron from metals on heating, Rectifying action of diode, Triode and its static mutual characteristics, Triode as an amplifier.
- 2. Cathode rays and Positive rays :** Cathode rays as stream of particles determination of e/m of the particles (using simultaneous electric and magnetic fields) discovery of the electron. Cathode ray oscilloscope (Elementary working principle only), e/m of positive rays, ions isotopes.
- 3. Photoelectric effect :** Photoelectric phenomenon, threshold frequency, E_k is independent of the light intensity, empirical relation , where B depends on the cathode surface and A is a universal constant, Einstein's explanation of photo electric effect.

(j) Radiation and Atomic Physics

- 1. Radiation :** Similarity between the nature of radiant energy and lights/Absorptivity, emissivity of surface, Kirchhoffs law, concept of a black body, Stefan's law, graphical description of spectral distribution of black body radiation (no formulae), elementary ideas of Plank's hypothesis.
- 2. Structure of atom :** Rutherford's experiments on particle scattering and his conclusions regarding (i) positively charged nucleus and (ii) applicability of Coulomb's law.. Origin of spectrum : Experiments of Franck and Hertz, quantized energy states of atoms, energy level diagram, emission and absorptions spectrum. Spectral series of Hydrogen atom, continuous, line and band spectra: their relationship with the state of matter, Fraunhofer lines and their explanation. Fluorescence and phosphorescence.
- 4. X-ray :** Production (Coolidge tube), control on the intensity and penetration, electromagnetic nature of X-rays.

(k) Nuclear Physics

- 1. Radioactivity :** Nature of α and β rays, concept of half life and statistical nature of the phenomenon of radioactivity. Scintillation screen and cloud chamber respectively for counting and tracking the charged particles (only general features including path tracking by a magnetic field), Composition of nucleus, fundamental particles, e,n,p, p and their anti-particles.
- 2. Nuclear energy:** Nuclear fission, mass defect, mass energy relation principles of conservation of mass and of energy. Principle of nuclear reactor. Elementary ideas of nuclear fusion, origin of solar energy.

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CHEMISTRY

Section - A : General Chemistry

1. Discovery and Properties of electron, proton, neutron. Elementary ideas of Binding Energy of Nucleus, Electronic configuration, electronic shells, subshells, Quantum number, Pauli's exclusion principle.
2. Detailed study of Electrovalent, covalent (including Kossels theory) and coordinate valence bonds and Electronic structure of compounds.
3. Radioactivity, Natural and Artificial disintegration, half life, fission and fusion, isotopes and isobars, radioactive isotopes and their uses.
4. Electrode potential and electrochemical series.
5. Oxidation and reduction reaction, oxidation number, balancing of equations by oxidation number and electron method.
6. Laws of gases, gas equation, Dalton Law of partial pressure, Simple numericals based on Graham's Law of diffusion.
7. Volumetric analysis and qualitative analysis.

Section-B : Inorganic Chemistry :

1. Detailed study of Mendeleef's periodic table (Excluding historical background). Position of the elements in the periodic table on the basis of atomic structure, modern periodic table, Periodic properties of elements Only definitions of (Atomic radius, Ionization potential, electron affinity).
2. Hydrogen and its compounds - Position of Hydrogen in Periodic table, isotopes of Hydrogen, Deuterium, Heavy Water, Laboratory methods of the preparation of Hydrogen Peroxide, outline of Industrial preparation, properties, uses and structure of H_2O_2 .
3. Studies of First group elements (Alkali metals) - Position of Na, K in the Periodic table on the basis of electronic configuration, Laboratory method for the preparation of NaOH, Na_2CO_3 , Na_2SO_4 , microcosmic salt, Outline of their industrial preparation, properties and uses.
4. Studies of second group elements (Alkaline earth metals) Position of Mg, Ca, Sr, Ba in the periodic table on the basis of configuration. Preparation of Plaster of Paris its properties and uses, outline of the Industrial preparation of Cement and its uses.
5. Studies of third group elements - Properties of Al, its uses and metallurgy, method of preparation of Anhydrous $AlCl_3$, Alum-their properties and uses.
6. Studies of fourth group of elements - Position of C and Pb in the periodic table on the basis of electronic configuration, Fuel gases (oil gas, water gas, coal gas, petrol gas) methods of preparation, outline of Industrial preparation and uses. Outline of Industrial preparation of glass and uses. Preparation of PbO its properties and uses, Preparation of White lead, Red lead, basic lead acetate, their properties and use.
7. Studies of fifth group elements - Position of N, P, As, Sb, Bi in the Periodic table on the basis of electronic configuration. Preparation, properties and uses of N_2 , NO , NO_2 , N_2O , Orthophosphoric Acid, Arsenious oxide, Methods of Industrial preparation of NH_3 , Nitrogenous and Phosphate Fertilizer.

8. Studies of Sixth group elements - Methods of preparation, industrial preparation, uses and structure of and .
9. Studies of Seventh group elements - position of Cl, Br, I in the Periodic Table on the basis of electronic configuration. Methods of preparation, Industrial preparation, properties and uses of and Bleaching powder.
10. Inert Gases - Position in Periodic Table, history of discovery, general characteristics, uses.
11. Transition elements - (1) General studies - position in periodic table, properties, (2) Position of IB, IIB and VIII group elements in the periodic Table, (3) Position of Cu, Ag, on the basis of electronic configuration. Metallurgy, preparation and uses of Cu and Ag properties, preparation, and uses of and . (4) Position of Zn, Cd on the basis of electronic configuration, Methods of preparation, properties and uses of calomel, corrosive sublimate, , ZnO. (5) Position of Fe in the periodic Table on the basis of electronic configuration, metallurgy and uses. Industrial production of Steel and Steel Industry of India. Methods of preparations, properties and uses of Mohr's salt and Ferric chloride.

Section - C : Physical Chemistry

1. Chemical Equilibrium : Law of Mass action, Velocity constant and Equilibrium constant (only in homogeneous gas system). Qualitative derivation of Le Chatelier's Principle.
2. Principle of electrolytic dissociation, Ostwald dilution Law, Degree of dissociation, dissociation constant, Hydrolysis, neutralisation, Strength of acids and bases, pH, Buffer solution, Qualitative description of acid bases indicators, solubility product and common ion effect (excluding the determination of constants).
3. Different methods to represent concentration of solution, properties of solution, lowering of vapour pressure by mixing a solute, Osmosis and determination of Osmotic pressure by Berkeley and Hartley's method, determination of molecular weight of non-volatile substances by the elevation of boiling point and depression of freezing point (excluding the derivation of formula).
4. Distribution of a solute in the non mixing liquid (excluding association, dissociation and complexing agents).
5. Catalyst : Properties, homogenous and heterogeneous catalyst, intermediate theory and modern absorption theory and Enzyme catalyst.
6. Definition of colloidal solution and its important properties (excluding electronic properties).
7. Thermochemistry – First law of thermo-dynamics, Definition and concept of internal Energy, heat of reaction, Heat of combustion, heat of formation, Heat of neutralization. Hess's Law and numerical problems based on it.

Section – D : Organic Chemistry

1. Simple methods of purification of organic compounds, Fractional crystallisation, Fractional distillation, Steam distillation and vacuum distillation, Chromatography, Criteria of purity, determination of mixed melting points and boiling points.
2. Quantitative determination of carbon, hydrogen, nitrogen, halogens and sulphur.
3. Isomerism : Structural (chain, position, functional and metamerism). Stereoisomerism (Optical isomerism of Lactic acid).
4. Simple examples of addition of halogens and hydrogen halides and their mechanism, elimination reaction (dehydrogenation and dehydration). Homolytic and heterolytic fission of bonds.
5. Classification and detailed nomenclature of organic compounds, IUPAC method.
6. (i) Aliphatic hydrocarbon :
 - a. General preparation and properties of alkanes

- b. General preparation and properties of alkenes
- c. Alkynes : Industrial preparation of acetylene
- d. Elementary ideas about the formation of high polymers based upon ethylene, butadiene and styrene.
- e. source of hydrocarbons, petroleum, synthetic petrol, octane number of fuels, cracking.
- (ii) Alkyl Halides : General methods of preparation of monohalogen derivative of alkanes. Laboratory method of ethyl bromide and its importance in organic synthesis. Trihalogen derivatives – General methods of preparation and properties of chloroform.
- (iii) Ethers : Laboratory preparation and properties and uses of diethyl ether.
- (iv) Alcohol : General methods of preparation and properties of monohydric alcohols, manufacture of methanol and ethanol, (Fermentation and enzyme control), simple properties of glycerol.
- (v) General methods of preparation, comparative study and general properties of aldehydes and ketones, laboratory preparation and uses of formaldehyde acetaldehyde and acetone. Polymerisation and condensation.
- (vi) Carboxylic acid : Laboratory preparation and properties of formic acid, manufacture and properties of acetic acid, simple properties of oxalic acid.
- (vii) Derivatives of carboxylic acid.
7. (a) Laboratory preparation, properties and uses of acetyl chloride.
- (b) Methods of preparation, properties and uses of acetic anhydride.
- (c) Methods of preparation, properties and uses of acetamide.
- (d) Urea : Method of preparation (ammonical or Potassium cyanate method) and properties.
- (e) Esters : Laboratory preparation and properties, ethyl acetate, oils, fats, soaps and waxes.
- (f) Amines : Laboratory preparation and properties of ethylamine.
8. Carbohydrates : Distinction tests of mono, di and polysaccharides, general reactions of glucose.
9. Our food and its constitution : Carbohydrates, proteins, fats and vitamins.
10. Aromatic Compound :
- (a) Hydrocarbons, Coal tar distillation, Comparative study of reaction of Aliphatic and Aromatic hydrocarbons.
- (b) Outline of benzene structure.
- (c) Laboratory preparation, important properties and uses of the following : Benzene, Toluene, benzene Sulphonic acid, Chlorobenzene, Phenol, Benzaldehyde, Benzoic acid, Nitrobenzene, Aniline.

*Apex Institute bears no responsibility about syllabus.

For **CPMT New syllabus** visit us at: www.apexinstitute.co.in

Imp. Notice

- CPMT special tests** (based on new syllabus) will be held **on 18th, 23rd and 25th May 2012** from 7-10 a.m.
- These all special tests will be **open to all free of cost**.
- New session will be started from **9th June 2012**.
- Students are advised to procure & solve the Apexian tests from number 1 to 22 very sincerely.**

BEST OF LUCK