**Maharashtra Board Class 12 Syllabus**

 **Physics**

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| **Chapters** | **Sub-topics** |
| 1. Circular Motion
 | Angular Displacement, Angular Velocity and Angular Acceleration, Equation for Velocity and Energy at Different Positions, Kinematical Equations |
| 1. Gravitation
 | Newton’s Law of Gravitation, Kepler’s Laws of Motion, Escape Velocity of a Satellite, Variation of ‘g’ due to Altitude, Latitude, Depth and Motion, etc |
| 1. Rotational motion
 | M.I., K.E. of Rotating Body, Rolling Motion, Radius of Gyration, Torque, Angular Momentum |
| 1. Oscillations
 | S.H.M., Projection of U.C.M. on any Diameter, K.E. and P.E. in S.H.M |
| 1. Elasticity
 | Elastic property, Deformation, Plasticity, Hooke’s Law, Poisson’s Ratio, Stress and Strain, Elastic Constants and their Relation |
| 1. Surface tension
 | Surface Energy, Surface Tension, Effect of Impurity and Temperature on Surface Tension, Angle of Contact |
| 1. Wave motion
 | Doppler Effect in Sound, Simple Harmonic Progressive waves, Transverse and Longitudinal Waves, Superposition of Waves |
| 1. Stationary waves
 | Vibrations in a Finite Medium, Vibrations of Air Columns, Stationary Waves on String, Free and Forced Vibrations, Resonance |
| 1. Kinetic theory of gases and Radiation
 | Derivation of Boyle’s Law, 1st Law of Thermodynamics, Wein’s Displacement Daw, Green House Effect, Stefan’s Law, Maxwell Distribution, |
| 1. Wave theory of light
 | Huygens’ Principle, Polarisation, Polaroids, Refraction at Plane Surface, Plane Polarised light, Wave Front and Wave Normal, Brewster’s Law, Doppler Effect in Light. |
| 1. Interference and diffraction
 | Young’s Experiment, Analytical Treatment of Interference Bands, Rayleigh’s Criterion, Interference and Diffraction. etc |
| 1. Electrostatics
 | Gauss’ Theorem, Dielectrics and Electric Polarisation, van-de-Graaff Generator, Energy Density of a Medium, etc |
| 1. Current electricity
 | Kirchhoff’s law, Wheatstone’s Bridge, Meter Bridge, Potentiometer. |
| 1. Magnetic effects of electric current
 | Ampere’s Law and its Applications, Ammeter, Voltmeter, Moving Coil Galvanometer, Cyclotron. etc |
| 1. Magnetism
 | Curie Temperature, Circular Current Loop as a Magnetic Dipole, Diamagnetism, Paramagnetism, Ferromagnetism |
| 1. Electromagnetic inductions
 | Laws of Electromagnetic Induction, Proof, Self Induction and Mutual Induction, Eddy Currents, etc. |
| 1. Electrons and photons
 | Photoelectric Effect, Einstein’s Equation, Hertz and Lenard’s Observations, |
| 1. Atoms, Molecules and Nuclei
 | Rutherford’s model of atom, Composition and size of nucleus, Hydrogen spectrum, Bohr’s model, Decay law, Radioactivity, mass- energy relation, etc |
| 1. Semiconductors
 | Zener Diode, Photodiode, Solar Cell, P-N junction Diode, I-V Characteristics |
| 1. Communication systems
 | Propagation of Electromagnetic Waves, Bandwidth of Transmission Medium, Bandwidth of Signals, etc |

**Chemistry**

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| **Chapters** | **Sub-topics** |
| Solid State | Classification of solids, unit cell in 2 & 3-dimensional lattices, calculation of density, voids, point defects, electrical and magnetic properties, Band theory of metals, conductors, semiconductors, insulators and n-p type semiconductors. |
| Solutions and colligative properties | Types of solutions, concentration of solids in liquids, Raoult’s law elevation of boiling point, solubility of gases in liquids, solid solutions, colligative properties, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, Van’t Hoff factor, etc |
| Chemical thermodynamics and energetic | Work, heat, energy, First law of thermodynamics, Hess’ law of constant heat summation, extensive and intensive properties, enthalpy of bond dissociation, Second and third law of thermodynamics, etc |
| Electrochemistry | Kohlrausch’s Law, lead accumulator, dry cell –electrolytic and galvanic cells, EMF, fuel cells, Nernst equation |
| Chemical kinetics | Activation energy, rate law and specific rate constant, Arrhenius equation, concept of collision theory, etc |
| General principles and processes of isolation of elements | Principles and methods of extraction, reduction electrolytic method and refining |
| p-Block elements | Group 15 elements, Group 16 elements, Classification of oxides, Group 17 elements, Group 18 elements, etc. |
| d and f Block Elements | Lanthanoids, Actinoids, first row transition metals, interstitial compounds, alloy formation |
| Coordination compounds | IUPAC nomenclature, Werner’s theory, coordination number, magnetic properties, VBT, CFT. isomerism, |
| Halogen derivatives of alkanes | Haloalkanes, Haloarenes, stability of carbocations, d-l and R-S configurations. |
| Alcohols, phenols and ethers | Nomenclature, physical and chemical properties, methods of preparation, etc |
| Aldehydes, ketones and carboxylic acids | Nomenclature, physical and chemical properties, methods of preparation, etc |
| Organic compounds containing nitrogen | Amines, Diazonium salts, Cyanides and isocyanides, etc |
| Biomolecules | Carbohydrates, Proteins, Vitamins, Nucleic acids, etc |
| Polymers | Classification, methods of polymerization, copolymerization, polythene, bakelite, nylon, polyesters, and rubber, Biodegradable, non-biodegradable polymers. |
| Chemistry in everyday life | Chemicals in medicines, Chemicals in food, Cleansing agents |

**Biology**

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| **Chapters** | **Sub-topics** |
| Genetics and Evolution | Genetic Basis of Inheritance, Gene- its nature, Expression and Regulation, RNA, Protein Synthesis; |
| Biotechnology and its application | Genetic engineering, Cloning a DNA Library, Plasmids, Bacteriophages, BT crops, Biosafety Issues, etc |
| Enhancement in Food Production | Tissue Culture, Plant Breeding, Single Cell Protein, Callus Culture, Biofortification, etc |
| Microbes in Human Welfare | Microbes in Household Food Processing, Industrial Production, Biogas Production, Biocontrol Agents, Sewage Treatment, Biofertilizers, etc |
| Plant Physiology | Photosynthesis, Respiration, Mechanism of Aerobic and Anaerobic Respiration, Fermentation, etc |
| Reproduction in Plants | Asexual Reproduction, Sexual Reproduction, Double Fertilization, Pollination, Post-fertilization changes, etc |
| Habitat and Niche | Ecosystems, Ecological Succession, Environmental Issues, etc |
| Zoology | Genetics and Evolution, Biotechnology and its Application |
| Genetics and Evolution | Origin and the Evolution of Life, Chromosomal Basis of Inheritance |
| Genetic Engineering and Genomics | DNA Fingerprinting, Genomics, Human insulin, Gene Therapy. Transgenic animals. |
| Human Health and Diseases | Immunology, Antigen-Antibody Complex, Pathogens and Parasites, Adolescence, drug abuse, Cancer and AIDS, etc |
| Animal Husbandry | Dairy, Animal Breeding, Fisheries, Lac culture, Poultry, Bee-Keeping, Sericulture |
| Circulation | Blood Composition and Coagulation, Heart, Pulmonary and Systemic Circulation, Cardiac output, Regulation of Cardiac activity, Blood Related Disorders, ECG, Lymphatic System |
| Excretion and osmoregulation | Modes of excretion, Excretory System, Role of Kidney in Osmoregulation, Regulation of Kidney Function, Disorders, etc |
| Control and Co-ordination | Nervous System, Sensory Receptors, Endocrine System, Hormones and their Functions, Common Disorders, etc |
| Human Reproduction | Reproductive System in Male and Female, Reproductive Cycle, Reproductive Health, Contraception and Sexually Transmitted Diseases, etc |
| Ecology and Environment | Biodiversity and its Conservation, Population and Ecological Adaptations, Environmental Issues, |

### **Mathematics**

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| Mathematical Logic | Applications of definite integral |
| Pair of straight lines | Applications of derivative |
| Matrices | Differential equation |
| Circle | Applications of definite integral |
| Trigonometric functions | Integration |
| Conics | Statistics |
| Vectors | Probability distribution |
| Linear programming problems | Bernoulli trials and Binomial distribution |
| Three-dimensional geometry | Continuity |
| Line | Differentiation |
| Plane |  |