Appendix - 1
Maths
Curriculum

Unit – 1

Point

- Co-ordinater system in R^1 and R^2 and distance function in R^1 and R^2. Properlier of distance function in R^1 & R^2

- The circumculer, centroid and Incenter of the triangle and Area of the triangle.

- Division of line-segment (Internal-External). Co-ordinater of the Division point. The necessary and efficient condition for three points in R^2 to be collinear. Locus-Point

UNIT – 2

Line and Lines

- The parametric equalians, cartesian equalism and some of the subsets of a line in sel notation form. The slope of a line and its geometrical interpretation. The necessary and sufficient condition for two distint lines are to be (i) parallel & (ii) mitually perperdicualr. The measures of an angle between the two intersecting lines and the equation of the bisectors of the angle between the two intersecting lines. The intercepts on the axes and slope of a line $ax + by + c = 0$. Various forms of equation of lines. The perpeudicular distance p and measure of α. concurrant lines-point of concurrace point. The system of equation of lines passing through the point of intersection of two lines. The perpendialr distance of (x, y) from the line $ax + by + c = 0$, $(a^2 + b^2 \neq 0)$

UNIT – 3

Circle

- The standard eqation, general equation and parametric equation of a circle. The centre and radius of the general equation of circles. The equation of a circle touching the axes. The equation of a circle where the extremities of the diameter are given. The intersection of line $ax + by + c = 0$ $(a^2 + b^2 \neq 0)$ with the circle $x^2 + y^2 = r^2$. The position of a point w.r.t the circle. The equalium of a tangent to the circle at a given point. The condition in the tengency of line to the circle and co-ordinats of point of contact. Length of the tangent drawn to the circle from the point outside the circle. Relation between two circles.

UNIT – 4

Parabola:

- Section of a Double cone by a plane. The standard equation and parametric equation of the parabola. Focus, directrix, Latus Rectaum of the parabola. The equation of a tangent at point (x_1, y_1) and at (t– point, of the parabola. The necessary and sufficiant. condition for a line $y = mx + c$ $(c = 0)$ to be a tangent to the parabola and the co-ordination of point of contact.

The properties of paralbola.

UNIT – 5.

Ellipse

- The standard equation & parametric equation of Ellipse the focii, Directrics, eccentricity, Latus - Rectum, equation of Auxilliary and Directes cirlce of the ellipse. The equation of tangent at point (x_1, y_1) and at θ-point and the necessary and sufficient condition for $y = mx + c$ to be a tangent to the ellipse and the co-ordinaters of point of contact. Properties of the ellipse. The position of a point w.r.t. the ellipse.

UNIT – 6

Hyperlorla

- The standard equation, parametric equation, focii, Directrics eccentricity, Lutus - Rectum, equation of Auxilliary and Directes circle of the Hyperlorla. The equation of tangent at point (x_1, y_1) and at θ-point and the necessary and sufficient condition for $y = mx + c$ to be a tangent to the hyperlorla and the co-ordinaters of point of contact. The properties of hyperlorla, Adymptoter and rectangular hyperlorla its equation and eccentricity and Foci.

UNIT – 7

Vector space and vecter Algebra - Geometric Representation of vedors

Properties of vector space

- Inner product, outer product, Box-product, Lagrauge's Identity, geometric representation in R^3, position vector, geometrical vectors An arbitarary reprentation of vector and direction of vectors. The necessary and sufficient condition for the vectors to be equal unique unit vector in the diredion of non-null vector swartz's in-equality. Angle between the two vectors. Osthogonal vector.

  - The vector perpeudicular to both the vector $\overline{x}$ & $\overline{y}$.

  - Unit vectors in the direction of axes.

  - Direction Angle, Direction cosiners, Direction ratios in R^2 & R^3.

  - Collinear & Co-planar vectors. The necessary and suffcient condition for two non-null vectors are to be collinear in R^2 & R^3. The necessary and sufficient condtion for three non-null vectors are to be coplaner in R^3.

UNIT – 8.

Applications of vectors to Geometry and Physics.

- Application & vectors to co-ordinate Geometry.

- Area of triangle and Geometrical meaning of $|\overline{a} \times \overline{b}|$

- The projection of vectors.

- For $\triangle ABC$ $\dfrac{a}{\sin A}$ $\dfrac{b}{\sin B}$ = $\dfrac{c}{\sin C}$

- Volume of a paralelopiped and Tetrahedron.

- Application of vectors in physics. force, its magnitude and it is direction. Work and relative velocity.

UNIT – 9

Line in space

- The equation of line passing through A $(\bar{a})$ and having direction of non null veder $\bar{l}$. Its parametric and cartesian equation.

- The equation of line passing through A $(\bar{a})$ and B $(\bar{b})$ - its parametric and cartesian equation.

- The necessary and sufficient - condition for three, distinct non-null vectors of R^3 to be collinear. Angle between two lines. The condition for two Intersecting lines. - coplanes lines and skew lines. Perpeudicular distance of a point from the line. The distance between the two parallel lines the shortest distance between the two skew lines.

UNIT – 10

Plane

- The vector equation, parametric equation and the cartesion equation in scalar form of a plane. The normal to the plane. The equation of a plane having intercepts a, b, c on the axes. Condition for four points of R^3 to be coplaner.

  The equation of a plane in $(r - \bar{a}) \bullet \bar{n} = 0$ form. The equation of a plane in $x \cos \alpha + y \cos \beta + z \cos \gamma = p$ from. The angle between the two planes. The equation of the plane passing through two interseting and paraller lines. The perpendicular distance of a point from the plane. The distance between the two paralle planes. The commansection of the intersection of two planes. The equation of a plane passing through two intersting planes. Image of a point w.r.t. plane. Angle between line and plane.

UNIT – 11

Sphere

- The vector, cartesian and general equation of sphere.
- The condition for the general equation represent the sphere its radius and centre.
- The equation of a sphere where exterimites of diameter are given.

UNIT – 12

Limit & Limit of a Sequence

- Interval, Neighbourhood, Properties of Neighbourhood
- Some important functions like Modulus function, Constant function, Identity function. Integer part function. Celling function. Exponential function. Logarathmatic function. Tri-function. Polynomial function. Rational function. Signum function.
- Odd - Even function.
- Limit of a function.
- L.H.S. & R. H. S. limit of function. Continuous function and continuty.
- Continuous function.
- Working rules of limit.

- Some standard form of limit
- Limit of composite function.
- Limit of trigonometric function.
- Limit of a sequence.
- Working rules of limit of sequence.
- If $|r| < |$ then $\lim\limits_{n\to\infty} r^n = 0$
- Limit of infinite Geometrical progression.
- Increasing, Discreasing, Bounded and Monotonic sequence.
- Typical sequence $\{a_n\}$ where $a_n = \left(1 + \dfrac{1}{n}\right)^n$, $\lim\limits_{n\to\infty} \left(1+\dfrac{1}{n}\right)^n = e$
- $\lim\limits_{h\to o} \left(\dfrac{a^h - 1}{h}\right) = \log_e a$

UNIT – 13

Differentiation

- Relation between differentiation and continuty.
- Working rules of differentiation.
- Derivatives of constant function. Exponential function, Logarithmatic function, Trigonometric function and polynomial function and Invers of Trignmetric function
- Chain rule.
- Derivatives of Inverse function.
- Derivatives of Implicit function and parametric function.
- Logarithmatic Differentiation.
- Differentiation of one function with respect to another function.
- Second order derivative and higher order derivatives.

UNIT – 14

Application of Derivatives

- As a rate measures, as a slope of tangent To find angle between two curves, to obtain approximate value. Rolle's theorem & Mean-value theorem. Increasing - Discreasing function Maximum - minimum, First and Second derivative test.

UNIT – 15

Indefinit Integration

- Working Rules of Integration.
- Integration of Algeoric function, Trignometric function.

  Exponential function, Logarithmatric function.

- Method of substitution for Integration.
- Trignometric substitution.
- Integration of $\dfrac{1}{a + b \cos x + c \sin x}$, $\sin^m x \cdot \cos^n x$, $\dfrac{1}{ax^2 + bx + c}$, $\dfrac{1}{\sqrt{ax^2 + bx + c}}$, $\dfrac{Ax + B}{ax^2 + bx + c}$, $\dfrac{Ax + B}{\sqrt{ax^2 + bx + c}}$
- Integration by part.
- Integration of $\sqrt{a^2 - x^2}$, $\sqrt{a^2 + x^2}$, $e^{ax}\sin(bx + c)$, $e^{ax}\cos(bx + c)$, $e^x[f(x) + f^1(x)]$, $\sqrt{ax^2 + bx + c}$, $(Ax + B)\sqrt{ax^2 + bx + c}$
- Integration by partial fraction.

UNIT – 16

Definit Integration & its Application (as Area)

- Definit integral as a limit of sum
- Working rules of definit integral
- Method of substitution for defint integral

- Thearems $\displaystyle\int_o^a f(x)\, dx = \int_o^a f(a - x)\, dx$, $\displaystyle\int_a^b f(x)\, dx = \int_a^b f(a + b - x)\, dx$,

$$\int_o^{2a} f(x)\, dx = \int_o^a f(x)\, dx + \int_o^a f(2a - x)\, dx$$

$$\int_{-a}^a f(x)\, dx = 2 \int_o^a f(x)\, dx \text{ is } f \text{ is even function.}$$

$$= o \text{ where } f \text{ is an odd function.}$$

UNIT – 17

Differential Equation

- Order and Degree of a Differential Equation.
- Formation of a Differential Equation.
- Solution of the Differential Equation.
- Differential Equation of variable - separable form.
- Differential Equation of first order and first degree.
- Homogeneous Differential Equations.
- Linear Differential Equation and it's solution.
- Tangent, Normal, Subtangent and Subnormal.

UNIT – 18
Dynamics

- Elementary Idea of motion.

- Displacement and length of path.

- Formulae for Acceleration and Retardation.

- Resultant Velocity.

- Decomposition of $\overline{\upsilon}$ in mutually perpendicular components.

- Motion of a particle on line.

- Motion of a particle falling freely under Gravitation.

- Motion of a projectile.

Chemistry
Curriculum

Unit – 1

Atomic structure and Chemical bonding

- Dual nature of matter and radiations, De-broglie's euqation. Light or radiation and matter waves, Heisenberg uncertainty principle. Wave mechanical nature of H-atom, Quantum numbers, Shapes of orbitals, relative energy of orbitals and rules for electron configuration, chemical bonds. molecular orbital theory, inter molecular attraction forces, metallic bond, H-bond, energy bond model, Hybridization in PCl_5 and SF_6.

UNIT – 2

The Solid State

- Classification of Soids, Crystal structur : X Ray - Crystallography - Co-ordination number and close packing structure - unit cell - calculation of number of atoms in unit cell - Holes in crystal rettice - Ionic radii and ratio of rodir, silicate compounds, electronics and atomic imperfection, classification of solids based conductivity, magnetic substances, amorphous solids, Network solids.

UNIT – 3

Types of Solutions

- Unit of concentration, Solubility of gases, Henry's law, solubility of solids. Colligative properties, Abnormal molecular weight and vant Hoff factor.

UNIT – 4

Thermodynamics

- First law and its limitations, important characteristics of spontaneous reactions second law of thermodynamics, Entropy of second law of thermodynamics, change in entryopy, expansion of ideal gas in vacuum and ΔS, free energy and second law of thermodynamics, standard free energy of formation of compounds. Free energy and equilibrium constant, Gibb's free energy and useful work, Limitations of second law of thermodynamics, Third law of thermodynamcis.

UNIT – 5

Electrochemistry

- Electrochemical cell (Galvanic cell), Donier cell and salt bridge, electrodes and types, Half-cells, cell potential, Determination of standard cell potential, EMF series, symbolic representaion, Nerst equation, concentration cell, Application of cell potentials, Electrolysis, Faraday's law of electrolys is electrolysis of water, NaCl, Na_2SO_4 $CuSO_4$ etc., Gibb's free energy and cell potential, Difference between electrochemical cell and electrolytic cell.

UNIT – 6

Chemical Kinetics

- Rate of reactions and factors affecting rate of reaction, equation of rate, rate constant and order of reactions, molecularity zero order, first order, pseudo first order reactions, effect of temperature of rate constant, energy of activation, reaction, mechanism.

UNIT – 7

Surface Chemistry

- Adsorption and its types, usefulness, Factors, Freundich adsorption, limitations, Langmuir adsorption isotherm effect of temperature, uses of adsorption, catalysis, Types of catalysis - Hetrogeneous and Homogeneaous, Nauture of solid adsorbent, shape-slective catalysis by zeolite, Enzyme catalysis, colloids.

Types of coloids

- Associated colloid - micelles

- Mechanism of micelle formation,

- Methods of preparation of colloidal sols,

- Preparation of lyophilic sols,

- purification colloidal sals, important properties of calloidal sols, coagulatio of colloids, Emulsions, preparation of emulsions, Demulsification uses of colodies.

UNIT – 8

P-Block Elements

General properties - Elements of 13th group

General properties - Aluminium occurance and extraction properties and uses of A1.

Group - 14 Occurance and uses of Tin and lead Silicon, tin and lead Isolation of S1 and its lead and its properties and Oxidn state with chemical reactivity - Silicate minerals.

Group - 15 General properties - Chemical reactivity and Oxidation states - Phosphorous occurance - isolation and properties - Uses of phosphorous compounds of phosphorus - phosphires - halides oxids - O $\times$ O acids - phosphate fertilizers.

Group 16 - Elements GP-16. General properties. Occurance and extraction of sulphur - allotropes of Sulphuer compounds of 16th GP elements Hydries halides - Oxids and 0×0 acids of sulphur - Manufacturing of H_2SO_4 - reaction & uses of H_2SO_4.

Group 17 - General properties - occurance and extraction and isoloation - oxidn state and chemical reactivity - Hydorgen holides - Oxides of chlorine - Oxoacids of halogen.

Group 18 - General properties, occurance & uses of noble gases - reactions of noble gases

UNIT – 9

d - and f block Elements

- Transition Elements and their elctron configuration - Pereodicproperties - alloys - capacity to form complexes - Magnetic properties - interstitial compounds - Non Stoichiometry compound - Occurance & extraction of Fe, Cu, Ag, Zn, Hg. Compounds of transition elements - Chemistry of Photography - F block elements properties and uses.

UNIT – 10

Complex and Organometallic Compounds

• Werner's theory - classification of ligands - tendency of transition metal ion to form complex requirement for formation of complex - strength of ligands and stability of complex - Geometry of complex - Hybridization of Orbitals, Magnetic properties, IUPAC names - Bomerism in complex - Organo metallic compound - complexes in nature - application of complex compounds - colour of complex.

UNIT – 11

Nuclear Chemistry

• Nuclear - Discovery of radio activity, type of radiation - group displacement.

• Radioactive decay - Nuclear stability.

• Nuclear binding energy - Decay constant.

• Nuclear reactions - Nuclear fission - Nuclear reactor. Breeder reacter. Nuclear fusion.

• Uses of radio isotops - Radiometic dating, Radio carboon dating.

UNIT – 12

Stereo Chemistry

• Gemetric - optical isomers - Modular assymetric chiratity and Enantiomers - Resolution of racemic mixture - coression to diastereo is over - Racemization - fischer projection formula - Diustereomers - meso compounds. - absolute configuration, - Configuration & confirmation chemical reaction and stereo chemistry

UNIT – 13

Alcohol - Phenol - Ethers

• Classification of alcohol - phenol and ether - IUPAC nomenclature of alcohol phenol and ether electronic structure of alcohols. physical and chemical properties of alcohol phenol & esterindustrial production of etheleneglycol - ethanol - phenol and ether - electronic structures.

UNIT – 14

Aldehyde - Ketons and Carboxyhic acid.

• Classification of corbony compounds - derivatives of carbocylic acid - Nomenclature of aldolhyde ketons, Carbocylic acid & its derivatives electronic sturcture of aldolhyde, ketons and acids physical & chemical properties of aldolhyds keton and carbonylic acids.

UNIT – 15

Amine, Cyanide, Isocyanide and nitro compounds.

• Classfication of amines - IUPAC. naming of amine, cyanid, isocyanide - electronic structure of amines - cyanids - physical and chemical properties of amine - cyanides, isocyanide comp. industrial production of Aniline - diazotization of aniline and Derivatives of benzane diazonium chloride.

UNIT – 16

Polymers Substances

- Properties of polymer - modification - in properties of polymers - classification of polymers - characteristics of polymers - General methods of polymerisation industrial production of important polymers. Natural rubber Valcanized rubber.

- Molecular mass of polymers - bio polymers - PHBV - PGA - PLA properties - proparation and Uses.

Unit –17

Bio Molecules

- Energy and Chemical change - classification of carbohydrates - Mono saccharides - Preparation - constitution - Disaccharides sucrose - Lecfose poly saccharides - starch cellulose, protein - aminoacids - nomenclature and classification - physical & chemical properties of α amino acids peptides - peptide - bond - poly peptide bond structure of protein, Enzymes - Nucleic acid structure of DNA - Lipids - classification of Lipids - Chemical structure - Waxes - hormones - Vitamins

Unit – 18

Chemistry in Everyday Life

- Medicines - dyes - cosmetics - chemicals used in food - stuffs - detergents - classification - pheromones - Rocket propallants - Modern materials - Carbon fihres and its uses - Gramics - Microalloyr.

Physics
Curriculum

Unit – 1

Static electricity

- Electric charge - Quantization of charge - Conservation of charge - Induction of charge - Coulomb's law - Law of superposition - Continous distribution of charge (linear, surface and volume, - Electric field - Electric field lines - Properties of electric field.

- Electric dipole and its field - Behaviour of electric dipole in electric field

- Electric field lines and their characteristics electric flux - Gauss's theorem and its uses.

- Line integral of electric field - Electric potential.

- Electric potential energy and potential difference.

- Electric potential due to point electric charge - Electric potential due to dipole - Electric potential due to different types of charge distributions.

- Equipotential surfaces - Relation between electric potential and electric field.

- Electric potential energy of system of charges - Potential energy of an electric dipole in electric field.

- Conductors and insulators - presence of bound and free charges in conductors - Dielectrics and polorization - Concept of capacitors and capacitance - Series and parallel connection of capacitors - Energy stored in a capacitor - In absence and presence of dielectric, capacitance of parallel plate capacitor - Van-de-graph generator.

UNIT – 2

Current electricity and its effects

- Electric current - Conduction of electricity in matellic conductors - Drift velocity and mobility and their relation with electric current - Ohm's law - Electric resistance - V-I characteristics.

- Electric resitivity and conductivity - classification of substances with respect to conductivity - Carbon resistors - Series and parallel connection of resistors.

- Temperature dependence of resistor - Internal resistance, potential difference and emf of an electric cell.

- Series and parallel connections of cells - Kirchhoff's laws.

- Wheastone's bridge - Potentiometer and their uses.

- Conversion of galvanometer into ammeter and voltmeter.

- Electric power - thermal effect of electric current and Joule's law. - Chemical effects of electric current - Faraday's law for electrolysis - charging of secondary cells - solid state cells.

- Thermo electricity - sources - Secback, Thomson and Peltier effects.

- Concept of magnetic field, Bio-Sawast's law and its uses - Lorentz force - Cyclotron - Force acting on a current carrying conductor placed in uniform magnetic field - Force acting on two parallel current carrying conductors and definition of ampere - Torque acting on a rectangular frame carrying current placed in uniform magnetic field - moving coil galvanometer.

UNIT – 3

Magnetism, Electromagnetic induction, Alternating current

- Current carrying coil as a magnetic dipole and dipole moment - Dipole moment of an electron revolving in orbit - Magnetic dipole (Bar magnet) - Magnetic field on axis and equator of a bar magnet - Magnetic field lines - Magnetic field of the Earth and magnetic substances - Electro magnets and permanent magnets.

  Electro magnetic induction - Faraday's law of electro magnetic induction - Induced emf and induced current - Lenz's law - Eddy currents - Self induction and mutual induction.

  A.C. currents - rms and maximum volume of a.c. current and voltage - Reactance and impedence - L - C Oscillations - L–C–R series circuit (Phasor method) – Resonating circuits and Q-factor - power in a.c. circuits - Wattless current - a.c. generator and transformer.

UNIT – 4

Electromagnetic waves and optics

- Hertz's experiment - The process of emission of electromagnetic waves - characteristics of electromagneitc waves - Electromagnetic spectrum - Electromagnetic radiation and Earth's atmosphere - Electro - magnetic waves and communication - Laws of reflection - Reflection of light by spherical mirrors - Gauss's law for spherical mirrors - magnifications - Refraction of light and laws of refraction - Phenomena of refraction of light - Total internal refraction and its uses - Refraction at a spherically curved surfaces - Thin lenses - Power of a lens - combination of thin lenses in contact - Refraction of light due to a prism - Dispersion of light by a prism - Rainbow - scattering of light - optical instruments - Human eye - Photographic camera - Spectrometer.

  Wavefront - Huygen's principle - Reflaction and refraction according to Huygen's theory - Interference - principle of super position - Types of interference - Young's experiment - Diffraction and types of diffraction - Fraunhfour diffraction by a single slit - comparision between interference and diffraction - Resolving power of telescope and microscope - Polarization - Tourmaline plate experiment - Nicol prism - Polarization by reflection and Brewster's law - Uses of polarization.

UNIT – 5

Dual nautre of radiation and matter, Atom and nucleus

- Discovery of electron, - X-ray and radioactivity - Black body radiation - plank's hypothesis-Development of quantum theory - Emission of electrons - photoelectric effect - photoelectric effect and wave theory of light - Einstein's explanation - photon - photocell - Dual nature of radiation and matter - Davisson - Germer experiment - electron microscope - Gieger - Marsden's experiment and Rutherford's model of atom - Atomic spectra - Energy quantization - Bohr model - X-rays - LASER - MASER.

Nucleus - Nuclear stability - Nuclear radius - Units in nuclear physics - Binding energy - Natural radioactivity - Radioactive radiation - Exponantial law of radioactive decay - half life - average life. Emission of α - particle, β particle and γ-radiation - Nuclear reaction - Nuclear fission - chain reaction and nuclear reactor - Thermonuclear fusion.

UNIT – 6

Semiconductor Electronics and Communication

- Conductors, insulators and semi conductors - N and P type semiconductors - P–N junction diode and rectification - Types of PN junction diode - Transistor and its types - Working of a transistor - Characteristics of a transistor - Transistor as an amplifier - Transistor oscillator - Digital electronics and Logic circuits - Primary concept of IC

  Communication systems and its types - modulation - production and detection of AM wave - Demodulator circuit - Digital communication - Modem and Fax - communication media - Satellite communication - Remote sensing - Line communication - Optical fibre communication.

Biology
Curriculum

Unit – 1

Water relations of plants

– Absorption of water, Diffusion permeability, Permeable membrane, Semi permeable membrane, Selectively permeable membrane.

– Osmosis, thistle funnel experiment

– Types of solution (Isotonic solution, Hypotonic and Hypertonic solution)

– Plasmolysis, Imbibition

– Water potential

– Absorption of water by root (Apoplast pathway, Symplast pathway, transmembrane pathway)

– Ascent of Sap, Root pressure theory, Cohesive force theory.

– Transpiration, Factors affecting transpiration

– Mechanism of opening and closing of stomata k^+ion theory, Factors affecting opening and closing of stomata.

– Significance of transpisration.

Mineral Nutrition

– Essential mineral nutrient, Source of essential elements, Essential elements and their importance (Nitrogen, Sulphur, Iron, Manganese, Zinc, Copper, Boron, Molybdenum, Chlorine)

– Absorption of mineral nutrients, simple or passive absorption of mineral nutrients,

– Diffusion

– Ion Exhange

– Donnan equilibrium

– Principle of mass flow

– Active Absorption of mineral nutrients. Transport of mineral nutrients, Nitrogen metabolism, Nitrogen Fixation, Synthesis of aminoacid (Reductive Amination and trans amination), Synthesis of protein.

UNIT - 2

Photosynthesis

– Site of photosynthesis, Mechanism of photo synthesis : A photochemical phase {photolysis of water and photophosphorylation (non cyclic and non cyclic)}, B. Biosynthetic phase, photorespiration, C_3 Paths, C_4 Paths, Factors affecting photosynthesis, Modes of plant nutrition

(Autotrophic nutrition, Photosynthetic nutrition, Chemosynthetic nutrition), Heterotrophic nutrition (parasitic nutrition, Saprophytic nutrition, Insectivorous plants.

Respiration

– Types of respiration, importance of respiration, respirable compounds, Aerobic respiration, Anaerobic respiration (In plants and animals).

– Biochemical process of respiration: Glycolysis Kreb's cycle, oxidative phosphorylation. Significance of Kreb's cycle, Synthesis of ATP during glycolysis, Synthesis of ATP during Kreb's cylce, Pentose-phosphate-path-way(PPP).

– Respiratory quotient of carbohydrates liquid organic acid and Anaerobic respiration.

– Compensation point.

UNIT - 3

– Kinds of nutrition, Heterotrophic nutrition in animals (Holozoic, Saprophytic, Parasitic and Symbiotic), Sub type of holozoic nutrition. (Herbivorous, Omnivorous, Insectivorous)

– Constituents and nutrients in food.

– Stages of nutrition (Ingestion, Digestion Absorption, Formation of Faecal waste and Egestion), Nutritional requirements of human; Nutritional deficiencies and deficiency diseases.

Digestive system of Cockroach and Human

– Types of digestive system in animals.

– Digestive system of Cockroach, Digestion in Cockroach, Digestive system of Human.

– Alimentary canal of human, structure of wall of alimentary canal, Accessory digestive organs of human, Ingestion of Food and its transport, Digestion of Food in stomach, In Duodenum, In jejunum. Role of hormones in digestion.

– Absorption of digested food, Egestion.

Respiration in Animals

– Types of respiratory system in animals, Respiration in earth-worm, Respiration in Cockroach, Spiracles, Mechanism of respiration, Respiration in Human.

– Respiratory organs of human mechanism of Breathing, process of inhalation, process of exhalation, Regulation of Breathing, – Exchange of gases at respiratory surface. – Transport of O_2 through blood, Transport of CO_2 through blood : As a solution, As Carbamino compounds and as Bicarbonate, Common respiratory diseases: Broanchitis, Asthma, Emphysema pneumonia, Profession induced-lung diseases, Lung Cancer.

UNIT 4

Circulation in animals

– Kinds of circulation : Open circulation and Close circulation, circulatory system of Cockroach, circulation of haemolymph.

– Human circulatory system: Blood, different types of blood cells and components of plasma, Human heart, Course of circulation through heart, Internal structure of heart, process of heart Beat, Sound of heartbeat, Pulse, Rhytmicity and regulation of heart beat, ECG, Blood vessels and blood circulation, Pulmonary circulation; systemic circulation,

–   Diseases related to blood : Hypertention Atherosclerosis, Arteriosclerosis.

Lymphatic system (Structure and function), lymphgland.

Excretion and Osmoregulation in Animals.

–   Formation of excretory waste and their kinds, Ammonotelic organism and Ammonotelism, Uriotelic organism and Ureotelism, Uricotelic organism and Uricotelism,

–   Excretory organs in animals, excretory organs in humans, Kidney internal structure of kidney, Structure of uriniferous tubule, Blood supply to uriniferous tubule, Locations of uriniferous tubules, Process of Urine formation (pressure filtration, Selective reabsorption, tubular secretion) Ureter, Urinary bladder, Urethra.

–   Role of Hormones in urine formation.

–   Constitution of urine, Kidney failure, Hemodialysis and artificial kidney, Kidney transplant, Roles of lungs in excretion, Role of skin in excretion. – Osmoregulation in Animals, Osmo confirmers, Osmoregulators, Osmoregulation in fresh water animals, Osmoregulation in marine animals, Osmoregulation in terrestrial animals.

Movements and locomotion in animals.

–   Basic types of movements : 1. Amoeboid movement 2. Ciliary movement 3. Muscular movement

–   Structure of striated muscle, process of muscle contraction. Stimulation of muscle, Red and White muscle.

–   Human skeletal system: Functions of Endoskeleton, Axial skeleton (Skull, Bones of cranium, Facial bones, Hyoid bone, Bones of Middle ear, Vertebral column, Sternum, Ribs) – Appendicular skeleton : (Pectoral girdle, Bones of fore limb) pelvic girdle, Bones of Hind limbs)

–   Joints and kinds of Joints : Fibrous joints, Cartilagenous joints, Synovial joints - Ball and Socket joints, Hinge joints and Pivotal joints.

–   Disorders related to Bones : Rheumatoid arthritis, Osteo arthritis, Gouty arthritis, Osteoporosis.

UNIT : 5

Nervous system of Cockroach and human

–   Types of nervous system in animals nervous system of Cockroach.

–   Human nervous system : 1. CNS 2. PNS

–   Structure of human brain, different regions of the human brain and their function (Brain stem, Diencephalon, Cerebellum, mid brain and cerebrum)

–   Reticular system, Limbic system, Structure of spinal cord, Functions of spinal cord.

–   Types of nerves, Peripherial nervous system; Spinal nerves, Cranial nerves.

–   Reflax action. Autonomous nervous system (Sympathetic and parasympathetic nervous) system, Receptor organs Structure of Eye, Accommodation, – Defects related to vision : Blindness due to glucoma, Myopia, Cataract, Short sight, Far sight. Structure and Function of Ear (External, Middle and Internal)

- Process of hearing. – Deafness of ear : Conduction deafness; Nerve deafness.

- Nose, Sensation of smell, Structure of tongue.

- Conduction of nerve impulse, Resting potential, Active potential, Repolarization. Conduction of nerve impulse through. Nerve fibre, Saltatory conduction, Synaptic conduction.

Human Endocrine System

- Properties of hormones. – Location, structure, function and regulation of pituitary gland.

- Location, Structure, Hormones and abnormalities of Thyroid gland, Parathyroid gland, Adrenal gland, Pancreas, Gonads (male and female).

- Hypothalamo - Hypophysial axis, Feedback control of hormone secretion.

- Role of hormones as chemical messangers and regulators. – Mode of action of steroid hormones. – Mode of action of peptide hormone.

- Comparision of endocrine system and nervous system.

UNIT - 6

Reproduction in Flowering plants

- Vegetative reproduction, Sexual reproduction.

- Methods of vegetative reproduction, Natural methods, Artificial methods : Cutting, Layering, Grafting.

  Significance of vegitative reproduction.

- Sexual reproduction, structure of pollengrain and development of male gametophyte, structure of ovule and development of female of a gametophyte, pollination, wind pollinated plants, Insect pollinated plants, water pollinated, plants, Fertilization, Development of Embryo and Endosperm; – Development of Embryo; Development of Endosperm, Incompatibility, Partheno genesis, polyembryo.

- **Growth and development in plants.**

- Characters of growth; Rate of growth

- Phases of growth : Phase of cell formation; Phase of cell elongation

- Phase of cell differentiation

- Factors affecting growth

- Measurement of growth

- Growth regulators: Auxin and effects of auxins

- Gibberrelins and effects of Gibberrelins

- Ethylene and effects of ethylene

- Cytokins and effects of Cytokinin

- Abscissicacid and effects of abscissicacid

- Seed dormancy; removal of seed dormancy

- Germination of seed; senescence,

- Abscission; Photoperiodism; Vernalization.

- Plants movement: Locomotory movements; Curvature movement

- Tropism and Nastism

UNIT - 7

Development in Animals

- Asexual reproduction, methods of asexual reproduction (Binary fission, multiple fission, Sporulation, Budding, Fragmentation)

- Sexual reproduction: Conjugation, Hemaphroditism, Parthenogenesis.

- Human reproductive system, Male reproductive system, Semen Sperm: Structure of Sperm.

- Female reproductive system :

- Ovarian cycle, Uterine cycle, ovulation,

- Fertilization

- Embryonic development of human

- Extra Embryonic membrane.

Growth, Regeneration, Ageing

- Growth : Embryonic growth, Post Embryonic growth, Cellular growth.

- Types of growth: Auxentic growth, Multiplicative growth and Accretionary growth.

- Growth rate and Growth curve

- Hormonal regulation of growth

- Regeneration, Range of regeneration in animals

- Types of regeneration

- Ageing; Life span : Maximum lifespan. Maximum lifespan of wild animals

- Human organs and Senescence.

- Causes of ageing, Endocrine theory, Programmed senesence theory, Immunological theory, Living theory, Free Radicle theory, Cross linking theory, Wear and Tear theory, Theory of error catastrophe, Somatic mutation theory.

- Ageing and death.

UNIT – 8

Organism and their Environment

- Levels of organization : Organism, Population, Community and Ecosystem, Biome, Biosphere.

- Environment, Habitat and Niche

    - Spatial and Periodic Aspects of Environment.

    - Habitat, Niche,

- Environmental factors : Climate, Microclimate, Atmosphere, Various layer of atmosphere, Gases in Water, Light.

- Effects of light in Aquatic Habitat; Zones of A quatic Habitat, (Littoral, Limnetic, Profundal).

- – Temperature.
- – Thermal stratification in Aquatic Habitat. Thermal stratification.
- – Water; Hydrological cycle, plant water relations, Soil, Soil profile, Soil properties.
- – Fire; Biotic factors, Range of Tolerance; Acclimatization; Ecological Adaptations.
- – Environmental Adaptations in plants;

  Adaptations to Light: Sciophytes, Heliophytes,
- – Adaptations to Water-Scarcity and High Temperature.
- – Adaptations to Aquatic Habitat.
- – Adaptations to Saline Habitat.
- – Environmental Adaptations in Animals; Migration, Dormancy - Aestivation and Hibernation.
- – Adaptations to water scarcity.
- – Adaptation to cold environment.

- **Population; Priotic community and Environmental Interaction.**
- – Population, Characteristics - Density, Natality, Mortulity, Dispersal; Age distribution.
- – Biotic potential and environmental resitance.
- – Population Growth : equation;
- – Forms of population growth: (i) J. shaped (ii) S. shaped.
- – Environmental interactions of organisms
- – Interactions of species

  A. Beneficial Relationships : Mutualism, Commensalism

  B. Harmful Relationships : Exploitation, Predation, Parasitism;
     (i) partial, (ii) total. Competition. Antibiosis.

- **Ecosystem and Major Biomes.**
  - Structure of Ecosystem, Biotic components, Herbivores, Carnivores, Omnivorous, Decomposers.
  - Functions of Ecosystem, (i) Energy flow (ii) Bio-geo-chemical cycling of materials.
- – Energy flow and productivity: Energy flow, Ecological pyramids: (i) Pyramids of Numbers (ii) Pyramids of Biomass (iii) Pyramids of Energy.
- – Productivity : Primary, Secondary
- – Ecological efficiency. – Eqnations.
- – Nutrient cycling (i) Sedimentary cycles (ii) Gaseous cycels.
- – Nitrogen cycle, Phosphorous cycle,
- – Decomposition, Process of decomposition, factors affecting decomposition.

  Biomes : Forest Biomes, Taiga, Temperate forests, Tropical forests, Tropical Deciduous forests, Grassland Biomass, Savanna, Desert biomass, Tundra,

- **Environmental Succession :**

  Definition of Succession : Causes of succession,

  (i) Initiating causes (ii) Ecesis : Migration, Ecesis, Aggregation and competition, Reaction. (iii) Stabilization.

  – Types of Succession : Primary, Secondary.

  – Hydroseric Succession : Pioneer stage, Sub-merged Hydrophyte stage, Floating stage, Reed-swamp stage, Sedge - Meadow stage,

  – Xerophytic Succession : Pioneer stage, Foliose Lichen stage, Moss stage, Climax.

  – Changes induced during succession.

UNIT - 9

- **Natural Resources; Their kinds; and sources:**

  - Kinds of Natural resources;

    (1) On the basis of Renewability.

    (a) Renewable : Forests, Grasslands; Aquatic, Marine.

    (b) Non-Renewable

    (2) On the basis of Amount

    (a) Inexhaustible (b) Exhaustible

  – Our Principal Natural Resources

  – Soil; Soil erosion, Deplation of soil fertility, Soil conservation; Methods of soil conservation;

    (i) Contour farming, (ii) Terrace farming. (iii) Crop rotation (iv) Tillage.

– Water : Sources of fresh water,

  - Water related problems

  - Water conservation and Water management.

– Land Resources :

  Forests; Deforestation; Forest management and forest conservation.

  Grasslands; Degradation of grasslands, Grassland management.

– Wetlands;

– Mineral recources.

– Energy resources; - Coal, Petroleum, Oil, Natural gas: Atomic energy, Biomass.

– Firewood; Petroplants, Biogas; Hydropower;

– Wind energy; Tidal energy, Geothermal energy, Ocean wave energy, Solar energy.

- **Pollution and its control :-**
  Definition. – Pollutions, Main problems of global concern, Kinds of pollution.

(A) **Air pollution**; Sources of air pollution; Thermal power stations, Automobites, Types of Air pollution; - Carbon compounds, Sulphur compounds, Oxides of Nitrogen, Hydrocarbons, metals, Particulate matter, Control of air pollution.

    (1) Control of Vehicular Exhanst pollution.

    (2) Control of Industrial pollution.

    (3) Control through laws.

(B) **Water pollution :** Types of water pollution; kinds of water pollutions and their sources,

– Sewage pollution, Sewage treatment plant.

– Industrial water pollution, Surface runoff pollution, effects of water pollution.

– Effect on Aquatic Ecosystems.

– Entrophication; Biological magnification; effects on Human Health; Groundwater pollution,

(C) **Soil pollution;** Control of soil pollution;

(D) Noise pollution.

– Environmental laws for control of pollution,

– Global Environmental changes.

    - Greenhouse effect and Global warming

    - Global Temperature and Greenhouse effect.

    - Steps to Avoid greehouse effect and global warming.

    - Depletion of ozone layer.

- **Biological Resources and Biodiversity :**

  Biodiversity, Levels of biodiversity (i) Genetic (ii) Species (iii) Biotic community diversity.

    - Gradients of Bio-diversity, Uses of biodiversity.

    - Sources of food and their improvement.

    - Medicinal sources; Significance of Ecosystem maitenance,

    - Threats to bio-diversity, Loss of Natural habitat, Fragmentation of habitat,

    - Over exploitation, Distrubance and pollution.

- Introduction of new species in the habitat.

- Extinction of species; Natural extinction, Mass extinction, Anthropogenic extinction.

- Susceptibility to extinction, endangered species, conservation of bio-diversity,

1. In situ conservation. - protected areas, biosphere reserves; -
   (1) Conservation (2) Development (3) Research, Education and monitoring.

2. Ex-situ conservation :

   • Rich and Threatened Reservation of life or Hot spots of Biodiversity :

• **Population - Environment and Development.**

- Growth of population; Forms of population growth curve,

- Human population, Human population growth; Birthrate; Mortality, Migration, Age and Sex structure.

- Human population growth;

- Effects of population growth (i) Productive systems (ii) Protective systems (iii) Waste assimilative systems.

- Development and environment.

- Reproductive health, Adolescence, Some common problems of adolescence, Social and moral implications, Mental health, Mental illness or behavioural disorders, Mental behavioural disorders.

1. Anxiety, 2. Obsessive-compulsive, 3. Attention - deficit 4. Mood 5. Schizophrenia

- Addictive disroders.

- Population - a resource

UNIT - 10

Food Production

– Effect of environment and genotype on performance of an 'Individual'

– Hybridization, or breeding, Animal breeding, inbreeding, out breeding, interspecific hybridization, F_1 hybrid, Improved varieties, Creation of genetic variations. Selection. Evaluation and spread of the variety. Seed culture and distribution to farmers, Biofertilizers, Plant tissue culture, Callus culture, Suspension culture, Utility of two types of culture, Applications, Embryo culture. Application (Utility).

– Crop and animal diseases and their control.

1. Fungal diseases 2. Bacterial diseases.

3. Viral diseases 4. Diseases caused by Nematodes.

Animal diseases, Biopesticides, Genetically modified food, Bio-war, Bio-piracy, Biopatent, Biotechnology and Sustainable agriculture, Sustainable Agriculture.

Immunity and Human Health :

– Antigens, Antibodies,

– Immunity

(1) Innate immunity(2)   Aquired immunity

(1) Innate immunity : Barriers :

(i) Anatomical (ii) Physiological (iii) Phagocyfic (iv) Inflammatory.

(2) Aquired immunity :

(i) Speccificity (ii) Diversity (iii) Discrimination between self and non-self. (iv) Memory.

-    Activation of Aquired immunity.

– Cell mediated immunity, T-cells

1. Killer T-cells, 2. Helper T-cells 3. Suspensor T-cells.

– Antibody - mediated immunity - B-cells

(i) Agglutination (ii) Opsonization, (iii) Neutralization.

– Types of Aquired immunity.

(1) Active (ii) Passive

– Immunological disorders;

(i) Hypersensitivity, (ii) Autoimmunity

– Immuno - deficiency diseases -

SCID; AIDS, HIV,

– Organ transplant;

1. Histo Compatibility.

2. Immuno repressants.

– Types of organ transplants

1. Autograft 2. Isograft 3. Allograft 4. Xenograft

Cancer : Characters; Types - carcinoma, Sarcoma, Lenkemia, Causes of Cancer, Symptoms of Cancer.

- Mothods of diagnosis of Cancer

  1. Clinical examination

  2. Histocytological tests.

  3. Radiation Techniques

     (i) Mammography

     (ii) Barrium test

     (iii) CT - Scan / CAT Scan

     (iv) MRI., DSA

  4. Laboratory tests.

  - Treatment of Cancer

     1. Surgery 2. Radiation Therapy. 3. Chemotherapy 4. Immunotherapy.

– AIDS

  - Transmission of AIDS.

  - Symptoms of AIDS - Three groups

  - Diagnosis of AIDS

     (i) ELISA Test

     (ii) W.B. Test

  - Treatment of AIDS

– Sexually Transmitted Diseases.

• **Modern Methods of Diagnosis :**

  - X-ray Radiography;

  - Digital Substraction Angiography

  - Commuted Tomography - CT, CAT

  - MRI

  - Positron Emission Tomography

  - Sonography

  - Endoscopy

- Recent Researches in vaccines

- Gene Therapy

- Hormone Therapy through biotechnology.

- Immunomodutation.

(1) Immunopotential Increasing Treatment.

(2) Immunosuppression Treatment.

Note : All the Figures and Tables of Textbook are included in Syllabus.

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