
BIOLOGY

CURRICULUM

Unit-1

PLANT BIOLOGY AND PHYSIOLOGY

1.1 Transport in Plant

Introduction

- (a) Means of Transport
 - Diffusion
 - Facilitated diffusion
 - Active transport
 - Comparison of Different transport processes
- (b) Plant water relation
- (c) Water potential
- (d) Osmosis **and aspects affecting the process of osmosis Thistle funnel experiment**
- (e) Plasmolysis
- (f) Imbibition
- (g) **Long distance transport of water**
 - How do plants absorb water ? (**Apoplast, symplast and transmembrane transport**)
- (h) **Transport of water in plant**
 - **Root pressure theory**
 - **Transpiration pull theory**
- (i) Transpiration; types, mechanism of opening and closing of stomata
- (j) Transpiration and photosynthesis, a compromise
- (k) Uptake and transport of mineral nutrient
- (l) Translocation of mineral ions
- (m) Phloem transport; flow from source to sink
- (n) Mass flow hypothesis (The pressure flow hypothesis)

1.2 MINERAL NUTRITION :

Introduction

- (a) Methods to study mineral requirement of plants, and types and advantages of hydroponics
- (b) Essentials of minerals
 - Criteria for essentiality and types and role of macro nutrients and micro nutrient, in plants, their source, relative amount, functions and their classification.
 - Deficiency symptoms of essential nutrient : N, K, P, Ca, Mg, S, Fe, Mn, Zn, Cu, B, Mo, Cl

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- (c) Toxicity of micronutrients
 - (d) Absorption of mineral nutrient, simple or passive absorption, Diffusion - Ion exchange, Donnan equilibrium, Principles of mass flow, Active transport
 - (e) Translocation of solute
 - (f) Soil as reservoir of essential elements
 - (g) Nitrogen metabolism
 - (h) Nitrogen cycle
 - (I) Biological fixation of nitrogen
 - (j) Synthesis of amino acids
 - Reductive amination
 - Transamination
 - (k) Synthesis of protein

1.3 GROWTH AND DEVELOPMENT IN PLANTS

Introduction

- (a) Growth
 - Growth as progressive development of an organism
 - Characteristics of growth
 - Process of growth
 - Primary and Secondary growth
 - Role of growth
 - Phases of growth : of cell division; of cell elongation, of cell differentiation
 - Grand period of growth
- (b) Factors affecting growth
(Water, Oxygen, Temperature, Light, Nutrient)
- (c) Measurement of growth
- (d) Development
Growth - regulators, Growth Promoters. Auxin, Gibberellin and Cytokinin Growth inhibitors (Ethylene, Abscisic Acid)
- (e) Seed Dormancy
- (f) Types of seed dormancy;
 - Exogenous and its sub groups, Endogenous and its sub groups
 - Combination, Dormancy and Secondary Dormancy
- (g) Various causes for seed dormancy
- (h) Removal of seed dormancy
- (I) Seed germination & its types
- (j) Senescence

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- (k) Abscission
 - (l) Photoperiodism
 - (m) vernalization
 - (n) Plant Movements
 - Locomotory movements, Autonomous and Induced
 - Curvature movements; Autonomous; Induced (Tropism and Nastism)

Unit-2

Photosynthesis and Cellular Respiration

1. Photosynthesis

Introduction

- (a) What do we know about photosynthesis ?
- (b) Early Experiments (Joseph Priestly, Jan Ingenhousz, Julius Von Sachs, Cornelius Van Niel, Robert Hill)
- (c) Where does photosynthesis take place / Site of Photosynthesis
- (d) Pigments are involved in photosynthesis
- (e) Light - reaction
- (f) The electron transport system
 - Photolysis of water (Splitting of Water)
 - Cyclic and non-cyclic photophosphorylation
- (g) Chemiosmotic hypothesis
- (h) Where are ATP and NADP used in Photosynthesis
- (i) The Primary acceptor of CO_2
- (j) The Calvin Cycle
- (k) C_4 Path / Cycle
- (l) Photorespiration
- (m) Factors affecting the process of Photosynthesis
 - Law of limiting factors
 - Light
 - CO_2 Concentration
 - Temperature
 - Water

2. Respiration

- (a) Introduction and Endergonic, Exergonic processes
- (b) Do Plants breathe ?
- (c) Glycolysis

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- (d) Fermentation (Alcoholic and Lactic)
 - (e) Aerobic respiration
 - (f) Tricarboxylic Acid Cycle and its Significance
Electron transport system and oxidative phosphorylation Mechanism of Chemiosmotic Generation of ATP
 - (g) The respiratory balance sheet]
 - Synthesis of ATP during Glycolysis
 - Synthesis of ATP during Krebs Cycle
 - (h) Amphibolic Path-ways
 - (i) Respiratory Quotient - (Carbohydrate, Protein, Fat)

Unit-3

1. reproduction in organism

Introduction

- (a) Asexual Reproduction in animal and Plant : Fission, sporulation, budding, fragmentation, spore formation
- (b) Vegetative propagation
 - Natural Methods
 - Artificial Methods; cuttings, layering, grafting
- (c) Significance of vegetative reproduction
- (d) Sexual reproduction
 - Prefertilization events: Gametogenesis; Gamete transfer and fertilisation
 - Post fertilization events : Zygote, Embryogenesis

2. SEXUAL REPRODUCTION IN FLOWERING PLANTS

Introduction

- (a) Flower : A Sexual reproductive part of Angiosperm
- (b) Prefertilization : Structure and Events
 - Stamen, Microsporangium and pollen grain
 - Internal Structure of Anther
 - Microsporogenesis
- (c) Structure of Pollen grain and development of male gametophyte
- (d) The Pistil
- (e) Megasporangium
- (f) Megasporogenesis
- (g) Embryo sac
- (h) Kinds of Pollination
 - Self pollination and its type
 - Cross pollination and its type

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- (i) Adaptations contrivance for self pollination
 - (j) Adaptation contrivance for cross pollination
 - (k) Agents of pollination;
 - Anemophily
 - Hydrophily
 - Zoophily (Birds and other animals)
 - (l) Out-breeding devices
 - (m) Pollen pistil interaction
 - (n) Artificial hybridization
 - (o) Significance of artificial hybridization
 - (p) Double Fertilization
 - (q) Post fertilization : Structure and Events
 - ® Endosperm
 - (s) Embryo and embryonic development in plant
 - (t) Apomixis
 - (u) Significance of Apomixis
 - (v) Poly embryo
 - (w) Importance of Polyembryony
 - (x) Fruit formation and development of seed
 - (y) Types of Fruits
 - (z) Dormancy in seed

3. Reproduction in human

Introduction

- (a) Sexual dimorphism in human
- (b) Reproductive system of human, principal organs, accessory organs and accessory glands)
 - Male Reproductive System
 - Female Reproductive System
- (c) Gameto Genesis
 - Spermatogenesis
 - Formation of Spermatids
 - Spermiogenesis
- (d) Oogenesis
- (e) Menstrual Cycle

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- (f) Fertilization and implantation of Embryo
 - (g) Pregnancy and Embryonic development with focus on changes occurring in embryo and foetus during development
 - (h) Parturition and Lactation

4. Reproductive Health

Introduction

- (a) Reproductive Health - Problem and Strategies
- (b) Population explosion and necessity to control birth control and patterns of birth control

Barrier Methods

- (a) Physical method
- (b) Chemical method
- (c) Intrauterine Devices (IUDS)
- (d) Hormonal methods
- (e) Sterilization
- (f) Natural methods
- (g) Medical termination of pregnancy
- (h) Sexually transmitted disease (Gonorrhoea, Syphilis, Genital herpes, Hepatitis - AIDS, Trichomoniasis) with their pathogen and major symptoms
- (I) Methods of diagnosis and their prevention and cure

Infertility

- (a) Basic understanding of ART
- (b) Common methods of ART
 - IVF (In Vitro Fertilization)
 - ZIFT (Zygote Intrafallopian Transfer)
 - GIFT (Gamete Intrafallopian Transfer)
- (c) Amniocentesis

Unit-4

1. Human Anatomy and Physiology-I

Digestive System and Digestion and absorption

Introduction

- (a) Digestive System of human and Digestive glands (Accessory and present in wall of alimentary canal)
- (b) Histological Structure of alimentary canal
- (c) Functions of each organ of alimentary canal

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- (d) Digestion of Food
 - Digestion in mouth
 - Digestion in stomach (Gastric)
 - Digestion in small intestine
 - (e) Role of enzymes and hormones in digestion
 - (f) Composition of digestive juice
 - (g) Absorbtion of food
 - (h) Disorders of digestive system (Inbrief)
 - Kwashiorkor, Gastritis, Peptic ulcer
 - Ulcerative colitis
 - Constipation
 - Jaundice
 - Diarrhoea

2. BREATHING AND EXCHANGE OF GASES

Introduction

- (a) Respiratory System of Human
- (b) Mechanism of respiration
 - Inspiration
 - Expiration
- (c) Respiratory volumes and Capacities
- (d) Exchange of Gases
- (e) Transport of Respiratory Gases
- (f) Transport of CO_2 in the blood
- (g) Transport of CO_2 in the blood
 - In form of Physical Solution
 - As chemical Compound
 - (i) Carbamino Compound
 - (ii) As Bicarbonate (In R.B.Cs) and In Plasma)
- (h) Release of CO_2 at Respiratory Surface.
- (I) Regulation of respiration
 - Nervous regulation
 - Chemical regulation
- (j) Disorders of Respiratory System (In brief)
 - Bronchitis
 - Asthma

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- Emphysema
 - Pneumonia
 - Occupational lung diseases

3. BODY FLUID AND CIRCULATION BLOOD

Introduction

- (a) Blood Plasma (composition and function) Blood
- (b) Blood corpuscles (Type, Proportion function and structure)
- (c) Blood Group (A, B, O, AB and Rh)
- (d) Concept of Erythroblastosis Foetalis
- (e) Coagulation of blood in detail
- (f) Numerical system for nomenclature of blood clotting factors.
- (g) Lymph
- (h) Circulatory path-way
 - Open and Close circulation
- (I) Human Circulatory System
 - Heart External Structure
 - Heart Internal Structure
- (j) Cardiac Cycle
- (k) ECG
- (l) Double Circulation
- (m) Regulation of Cardiac activity
- (n) Disease related to blood circulation
 - Hypertension
 - Atherosclerosis
 - Arteriosclerosis

4. EXCRETORY PRODUCTS AND THEIR ELIMINATION

Introduction

- (a) Preliminary idea of Nitrogenous Waste like Ammonia, Urea, Uric acid)
 - Ammonotelism, Ureotelism, Ammonotelic, Ureotelic and Ureotelism, Uricotelic animals
- (b) Human Excretory System with internal Structure
- (c) Structure of Kidney and Ultra structure of Nephron
- (d) Type of nephron
 - (I) Juxta Medullary nephron
 - (ii) Cortical nephron

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- (e) Urine Formation
 - Glomerular Filtration
 - Selective reabsorption
 - Tubular Secretion
 - (f) Functions of the Tubules
 - Proximal Convolute tubule (PCT)
 - Descending limb of loop of Henle
 - Ascending limb of the loop of Henle
 - Distal Convolute tubule (DCT)
 - (g) Mechanism of Concentration of the filtrate (General concept of counter current mechanism and osmolarity of regions of kidney)
 - Henle's Loop
 - Vasa Recta
 - (h) Regulation of Kidney function
 - (i) Micturition
 - (j) Composition characteristics and importance of Urine in clinical diagnosis.
 - (k) Role of other organ in excretion in animals
 - (l) Disorders of Excretion in animal
 - Uremia
 - Kidney Failure
 - Renal Canaliculi
 - Nephritis

Unit-5

Human Anatomy and Physiology-II

1. LOCOMOTION AND MOVEMENTS AND SKLETAL SYSTEM

Introduction

- (a) Different types of locomotion and movements in animals
- (b) Types of Movements
 - Amoeboid
 - Ciliary / Flagellary
 - Muscular
- (c) **Muscle** - General Properties & Informations
- (d) Types of Muscle
 - Skeletal
 - Visceral
 - Cardiac

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- (e) Ultrastructure of Skeletal Muscle
 - (f) Structure of Contractile Protein
 - (g) Mechanism of Muscle Contraction
 - (h) Type of Skeletal muscles : Red and White
 - (I) Skeletal System of human
 - (j) Axial Skelatal System
 - Skull
 - Vertebral Column, Sternum, Rib
 - (k) Appendicular Skeletal System
 - fore limb and pectoral girdle
 - Hind limb and pelvic girdle
 - (I) Joints
- Types of Joints
- Fibrous
 - Cartilagenous
 - Synovial Joints
- (m) Disorders of Skeletal System
 - Myasthenia Gravis
 - Tetany

2. NEURAL CONTROL AND CO-ORDINATION I ANIMALS AND NERVOUS SYSTEM

Introduction

- (a) Nervous System
- (b) Nerve Cell - Structural and functional Unit of nervous system
- (c) Structure of nerve cell
- (c) Initiation of the impulse or action potential
- (d) Conduction of nerve impulse through nerve fibre Resting Potential
 - Structure of nerve fibre
 - Action Potential
- (e) Conduction of nerve impulse (Property and saltatory conduction)
- (f) Transmission of nerve impulse at a Synapse

HUMAN NERVOUS SYSTEM

Central nervous system (CNS)

Peripheral nervous system (PNS)

(CNS in detail, PNS -Just in brief)

CENTRAL NERVOUS SYSTEM

Brain :- Fore brain, Mid brain, Hind brain

SPINAL CORD

- (a) Reflex action; reflex Arc
- (b) Conditioned acquired reflex and unconditioned reflex
- (c) Sensory reception and processing
 - Eye Structure and processing
 - Mechanism of vision
- (d) Structure of Ear
- (e) Mechanism of hear
- (f) Disorders of Nervous system
 - Multiple Sclerosis, parkinson's diseases
 - Sciatica

(3) CHEMICAL CO-ORDINATION AND CONTROL:

Endocrine Glands and their hormones, General Functions of the hormones their Hypo and Hyper activities and related disorders.

- (a) Hypothalamus
- (b) Pituitary Gland
- (c) Pineal Gland
- (d) Thyroid Gland
- (e) Parathyroid Gland
- (f) Thymus
- (g) Adrenal Gland
- (h) Pancreas
- (i) Testes
- (j) Ovary
- (k) Hormones of heart, kidney and Gastrointestinal tract
- (l) Mechanism of Hormone action

Unit-6

1. Genetics and Molecular basics of inheritance

Introduction

- (a) Historical Background of Heredity
- (b) Mendel's Work
- (c) Monohybrid experiment
 - Law of dominance
 - Law of Segregation
 - Test Cross

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- (d) Dihybrid Experiment
 - Law of independent assortment
 - (e) Evaluation of Mendel's Work
 - (f) Incomplete dominance
 - (g) Co-dominance
 - (h) Polygenic Inheritance
 - (I) Multiple Allele
 - (j) Pleiotropism
 - (k) Chromosomal basis of inheritance
 - (l) Linkage and Recombination
 - Linkage in Sweet Pea Plant
 - Linkage in Drosophila
 - Crossing over in Drosophila

2. SEX- DETERMINATION

Introduction

- (a) Chromosomal theory of sex determination
- (b) Theory of heterogametes
 - XX - XY type
 - (i) XX female - XY male type
(e.g. Drosophila & Man)
 - (ii) XY female - XX male type
 - XY - XO type sex-determination
 - (i) XX female and XO male type
 - (ii) XO female and XX male type
- (c) Gene balance theory
- (d) Haploidy and Diploidy mechanism
- (e) Gynandromorph
- (f) Barr - body test
- (g) Environmental effect on sex-determination
- (h) Hormonal theory of sex-determination
- (I) Sex-determination in plant
 - Sex differentiation in monoecious plant
- (j) Genetic Variation
 - Mutation
 - Types of mutation
 - Numerical mutation in chromosome
 - (I) Euploidy
 - (ii) Aneuploidy

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- (k) Structural abnormalities in chromosome
 - (i) Chromosomal Aberration
 - Deletion
 - Duplication
 - Inversion
 - Translocation
 - (m) Gene Mutation
 - (n) Genetic disorder
 - (o) Pedigree analysis
 - (p) Mendelian disorders
 - Haemophilia
 - Colour blindness
 - Thalassamia
 - Sickle cell anemia
 - (q) Inborn errors of metabolism
 - (i) Phenyl Ketonuria
 - (ii) Alkaptonuria
 - (iii) Albinism
 - (r) Human Karyotype and blood culture method
 - (s) Chromosomal disorders
 - Down Syndrome
 - Turner's Syndrome
 - Klinefelter's Syndrome

3. MOLECULAR BASIS OF INHERITANCE

Introduction

- (a) DNA as Genetic material
 - Bacterial transformation or Griffith- effect
- (b) Avery, McCarty & Macleod experiment to prove DNA as Genetic Material
 - Transformation/ Synthesis of DNA in Lab.
 - DNA as a Genetic Material
- (c) DNA- Molecular Structure
- (d) Properties of Genetic material (DNA) Versus RNA.

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- (e) Replication of DNA
 - Mechanism of DNA replication
 - (f) Transcription
 - (g) Genetic Code - Triplet Code
 - (h) The main properties of genetic code
 - (I) Mutation and Genetic Code
 - (j) t - RNA
 - (k) Central dogma
 - (l) Translation : Biosynthesis Protein
 - (I) Initiation
 - (ii) Elongation
 - (iii) Termination
 - (m) Gene -
 - (n) Regulation of Gene expression
 - (o) Operon Concept (Structural gene and control gene)
 - (I) Regulator Gene
 - (ii) Promotor Gene
 - (iii) Operator Gene
 - (p) Negative and Positive regulation

4. HUMAN GENOME PROJECT

Introduction

- (a) Goals of HGP
- (b) Future challenges of HGP
- (c) Application of Human Genome Project
- (d) Salient Feature of Human Genome
- (5) DNA Finger Printing**

Introduction

- (a) Making of DNA Finger Prints.
- (b) Application of DNA Finger Print.

Unit-7

Biotechnology

1. BIOTECHNOLOGY : PRINCIPLES AND PROCESSES

Introduction

- (a) Principles of Biotechnology
 - (1) Genetic Engineering
 - (2) Maintenance of Sterile Condition (Chemical Engineering)

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- (b) Tools of DNA Recombinant Technology
 - (1) Restriction Enzymes
 - (2) Cloning Vectors (requirement to facilitate cloning into vector)
 - (3) The Stages involve in the basic principles of recombinant DNA technology
 - (4) Competent Host
 - (c) Process of Recombinant DNA Technology
 - (1) Isolation of the Genetic Technology
 - (2) Cutting of DNA at Specific Locations
 - (3) Amplification of Gene of Interest using PCR (Denaturation Annealing, Extension)
 - (4) Insertion of recombinant DNA into Host Cell / Organism
 - (5) Obtaining the Foreign Gene Product
 - (6) Down Stream Processing.

2. BIOTECHNOLOGY AND ITS APPLICATION

Introduction

- (a) Biotechnological Applications in Agriculture
- (b) Genetically modified organism
 - Bt- Cotton
- (c) Biotechnological Application in Medicine
 - Genetically engineered Insulin
 - Gene Therapy
- (d) Transgenic Animals
- (e) Ethical issue
- (f) Biopatent
- (g) Biopriacy
- (h) Biosafety issue

Unit-8

Ecology and Evolution

1. ORGANISM AND POPULATION

Introduction

- (a) Meaning, Definition and Various branches of ecology
- (b) Environment
- (c) Habitat
- (d) Basic Concept of ecology

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- (e) Major abiotic factors
 - Light
 - Light reaction to Plant
 - Light reaction to Animal
 - Temperature factor
 - Temperature factor in reaction to plants
 - Temperature factor in reaction to animal
 - (f) Water : Water as mother of life; thermal stratification, temperature variation in difference habitat
 - Water balance and adaptations
 - Water problems in sea-water
 - Water problems in terrestrial habitat
 - (g) Soil as abiotic factor and its fauna and flora
 - (h) Response to abiotic factors
 - To cope with unfavourable condition
 - Regulate
 - Conform
 - Migrate
 - Suspended
 - (I) Adaptations
 - (j) Population
 - (k) Salient features of population
 - (l) Characteristics of population
 - Density
 - Natality ; Carrying capacity
 - ; potential natality (maximum natality)
 - Mortality ; Realized and potential mortality, vital mortality
 - Age Distribution - Age pyramid
 - Population growth
 - Population Equilibrium : Growth curves
 - Population fluctuation
 - Population interaction
 - (m) Factors affecting on population growth
 - Extrinsic - Food, shelter, space weather etc.
 - Intrinsic - Competition, predation Emigration, Reproductivity and diseases.

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- (n) Life history variation
 - (o) Types of population interactions, Interspecific interaction, mutualism, competition, predation, parasitism, Commensalism, Amensalism.
 - (p) Biotic communities and its examples
 - Characteristics of biotic community species diversity - Structure, Community Dominant, Ecological niche, Succession.
 - (q) Ecological Succession
 - Basic types of succession
 - (r) General process of succession
 - (s) Pattern of succession - Xerosere, Hydrosere, Mesosere.

2. ECOSYSTEM

Introduction

- (a) Kind of ecosystem
- (b) Structure of ecosystem in detail
- (c) Functions of ecosystem in detail
- (d) Food chains - Grazing and detritus food chain
- (e) Food Web
- (f) Trophic levels
- (g) Ecological Pyramid - of Numbers
- (h) Ecological Pyramid - of Biomass
- (i) Ecological Pyramid - of Energy
- (j) Energy Flow
- (k) Types of Productivity
 - Primary Productivity (GPP & NPP)
 - Secondary Productivity
 - Net Productivity
- (l) Decomposition
 - Process of Decomposition
- (m) Bio-geochemical Cycle
 - Gaseous cycle (Carbon, Nitrogen, Oxygen)
 - Sedimentary Cycle (Phosphorous and Sulphur)
- (n) Carbon Fixation
- (o) Pollution free Oxygen
- (p) Facts about Oxygen

3. BIODIVERSITY AND ITS CONSERVATION

Introduction

- (a) Types of biodiversity
 - Genetic diversity
 - Species (α -diversity, β -diversity and γ -diversity)
 - Ecological diversity
- (b) The Composition of biodiversity
- (c) AIMS of biodiversity
- (d) Patterns of biodiversity
 - Latitudinal gradients
 - High biodiversity in tropics:
 - Speciation
 - Effect of environment
 - Species area relationship
- (e) Importance of Bio-diversity
(Food, Productive use value, Aesthetic and Cultural benefits, Ecosystem services)
- (f) Biodiversity at world level
 - At World Level
 - At National Level
 - Biodiversity of Gujarat
- (g) Loss of biodiversity
- (h) Causes of bio-diversity losses
 - Habitat loss and fragmentation
 - Over - exploitation
 - Alien Species invasion
 - Co-extinction
- (I) Biodiversity conservation
- (j) Method to conserve biodiversity
 - In-situ conservation
 - Ex Situ conservation
- (k) In-situ Conservation
 - Benefits of Protected Area
 - National Park
 - Sanctuaries
- (l) Biosphere reserves and its zones
(1) Core Zone (2) Buffer Zone (3) Transitional Zone etc.
- (m) Ex-situ conservation
 - Importance and examples and general idea.
 - Seed bank
 - Gene bank

4. ENVIRONMENTAL ISSUES

Introduction

- (a) Air Pollution and its control
- (b) Control of Air Pollution
- (c) Air Pollution due to vehicles a case study of Gujarat
 - Water pollution and its control
 - Domestic sewage and Industrial effluents
 - “Eutrophication”
 - Biological magnification
 - Waste water treatment
 - Solid waste
 - Composite waste
 - Domestic hazardous waste and toxic waste
 - Use of plastic waste
 - Salient features of polymer - waste - bitumen mix road
 - Agrochemicals and their effects
 - Case study of Organic farming
 - Radio active waste
 - Greenhouse Effect and Global Warming
- (d) Steps to control global warming
- (e) Ozone depletion in the stratosphere
- (f) Degradation by improper resource utilization and maintenance
- (g) Soil erosion and desertification
- (h) Water logging and soil salinity
- (I) Deforestation
- (j) People participation in forest conservation
- (k) Study of three beneficial environmental issues.

5. EVOLUTION

Introduction

- (a) Origin of life
Abiogenesis, Biogenesis, Meteorite Theory, Theory of Eternity,
Theory of Catastrophism, Theory of Organic Evolution.
- (b) Oparin - Haldane theory :
 - Chemical Evolution
 - Biological Evolution
- (c) Experimental evidences for evolution of life
 - Urey and Miller’s experiment

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- (d) Stages of Evolution of life forms
 - (e) Evidences of evolution :
 - Morphology Organ
 - Analogous Organ
 - Homologous Organ
 - Vestigeal Organ
 - Connecting link
 - Embryology
 - Physiological
 - Palaentological
 - (f) Adaptive radiation (concept, types, causes) and classification
 - (g) Biological Evolution
 - (h) Lamarckism
 - (I) Drawbacks of Lamarckism
 - (j) Drawinism
 - (k) Limitation of Drawinism
 - (l) De Vries theory
 - (m) Modern Concept of Evolution
 - (n) Mechanism of Evolution
 - (o) Hardy - Weinberg Law
 - Gene Pool
 - Gene frequency
 - Practical application of law
 - Significance of law
 - (p) Gene Flow
 - (q) Genetic drift
 - (r) Brief account of evolution
 - (s) Origin and Evolution of Man.
 - (t) Human Evolution trends
 - (u) Fossil's record of man's evolution
(Propliopithecus, Aegyptopithecus, Dryopithecus, Oreopithecus,
Ramapithecus, Kenyapithecus Australopithecus, Homo erectus, Homo Sapiens,
Neanderthan man, Rhodesian Man, Cro-Magnon Man)
 - (v) Modern Man.